# MACHINE TOOL Blue Book

NOVEMBER 1941


## )oAll CUTS WHOPPERS LIKE THIS

### 1850 POUND DIE

No, it's not a big Wisconsin cheese, but a solid steel die weighing 500 pounds more than the DoAll Machine on which it was cut in the plant of the Midwest Pipe & Supply Co., St. Louis, Mo.

**"GLASS BOOT" DIE PARTS**
Assembly die sawed and filed in 90 minutes at the Taylor Instrument plant, Rochester, N. Y. This die makes parts for the famous "glass boot" used in hospitals.

**3 GZ. CASKETS**
Cutting gaskets generally a pain in the neck is easy with a DoAll. The paper is screwed between two plates, and cut made through the plates.

### EST METHOD OF REMOVING METAL

no difference what it is—aluminum, brass, bronze, iron, steel, nickel, zinc—any kind of metal, alloy tic—forgings, castings, tubing, blocks or sheets oAll cuts it with savings of time and metal that onishing.

s the place of shaper, milling and lathe work on ds of different jobs in large and small defense and al plants everywhere. In addition to internal and l sawing, the DoAll does band filing and polishing.

VILL PAY YOU to have one of our factory men call at your plant to show you what a can save you.

DO-ALL Contour Machines
BAND SAWING
BAND FILLING
BAND POLISHING

FREE—Literature and 158-page Handbook on Contour Machining

ITINENTAL MACHINES, INC.
) S. Washington Ave., Minneapolis, Minn.

Associated with the DOALL COMPANY, DesPlaines, Ill. Manufacturers of Band Saws and Band Files for DoAll Contour Machines

# "Versatility" and "Speed" Characterize these two MARVEL SAWS

For the stockroom of this special furnace builder, what better combination could you ask . . . a MARVEL No. 8 Metal Cutting Band Saw for versatility, and a MARVEL No. 4B High Speed Hack Saw for miscellaneous cutting-off.

For all-around versatility, the universal No. 8 Saw is unequalled. It will cut at any angle from 45° right to 45° left; will nip off a 1/8" drill rod or cut down an 18"x18" die block. It has a large "T"-slotted planer type table for setting up big work and a quick action machine vise for small pieces. It has a combination hand and/or power feed. It does cutting-off, mitering, notching and indexing, and saves hours of machining by roughing pieces and parts to size or shape. In many shops it eliminates warehouse delays and "cutting extras".

The MARVEL 4B Hack Saw is an exceedingly fast-cutting, light-duty saw (Capacity 6"x6") designed for high-speed cutting-off. It is designed for miscellaneous "run-of-the-hook work" and is surpassed in speed only by the heavy-duty, all-ball-bearing MARVEL 6, 6A, 9 or 9A High Speed Saws.

**ARMSTRONG-BLUM MFG. COMPANY**

**5700 Bloomingdale Ave.** *"The Hack Saw People"* **Chicago, U.S.A.**

Eastern Warehouse & Sales: 225 Lafayette St., New York

# "You can DELIVER THE GOODS with HOBART *Simplified* ARC WELDING"

Today, no alibi is acceptable for delay! Work MUST be done as scheduled! If your work entails the joining of metals you can speed up production and get a better job as hundreds have done with Hobart Arc Welders.

The exclusive Multi-Range Dual Control offers the operator a choice of 1,000 combinations of welding heat without a single "dead spot". Liberal use of copper and the improved ventilation system guarantees a cool operating welder always.

In every way a Hobart is built to do a better job faster . . . with greater profit! Write for details.

***Remote Control*** is another exclusive Hobart cost-saving feature that lets the operator make adjustment of welding heat at the work no matter how far he may be from the machine.

**HOBART BROS. CO., Box TB-111, TROY, O.**

*"One of the World's Largest Builders of Arc Welders"*

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Please send complete information on items checked:

- ☐ Electric Drive
- ☐ Gasoline Drive
- ☐ Electrodes
- ☐ Welding School
- ☐ Build-Your-Own
- ☐ Free Booklet

NAME _____

ADDRESS _____

HOBART
*Simplified*
RC WELDERS

FASTEST SELLING ARC WELDER ON THE MARKET TODAY

# RIVETT 715

## *All in a Name:*

"RIVETT" stands for 53 years experience in the building of precision bench lathes. "715" stands for a sensitive high speed, light duty, precision bench lathe having 7" swing and 15" center distance. The spindle runs in true dynamic balance at selective speeds from 100 to 3500 r.p.m. and takes draw-in collets up to ¾" diameter capacity. For further information on this and other Rivett bench lathes write today.

**RIVETT LATHE & GRINDER INC.**
BRIGHTON, BOSTON, MASS.
PIONEERS IN BENCH LATHE DEVELOPMENT

# HARDINGE

## UNUSUAL CAPACITY

**(No. 3 OF A SERIES)**

Hardinge pioneered the feature of having ample collet capacity. While always desirable, this feature is of particular value today. With it is combined the Hardinge preloaded ball bearing spindle construction, providing a range of spindle speeds for the proper machining of bar material, varying from 1/32" to 1" diameter or chucked work to 5" diameter.

The Hardinge 1" collet capacity is not through the use of a sleeve or other arrangement, but is direct in the spindle to provide the greatest degree of accuracy.

Another added advantage is that, with Hardinge, there is a matched relation between the various machines for interchangeability of collets, as well as a number of other attachments used in the spindle of each machine.

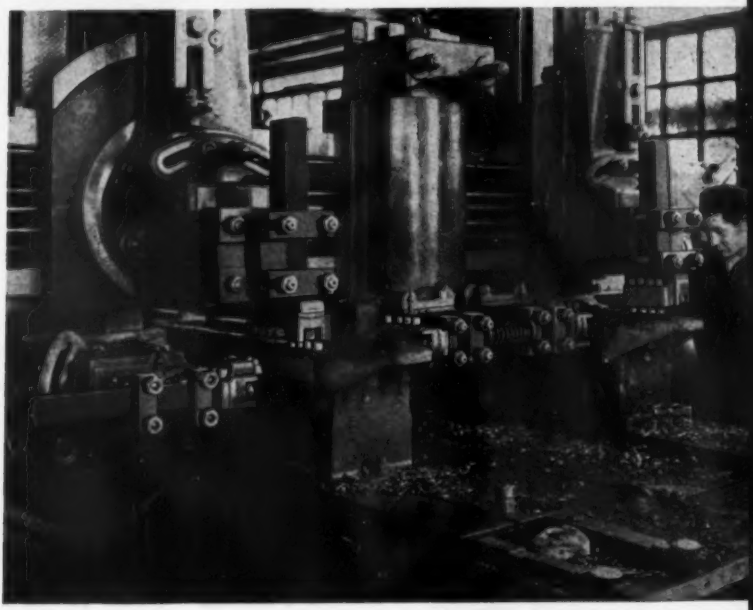
*"Specify Hardinge and you are assured of engineered efficiency."*

## HARDINGE BROTHERS, INC.

ELMIRA, N. Y.

Performance has established leadership for Hardinge

# ARMSTRONG



## Make each ounce of High Speed Steel equal to 10 ounces with ARMSTRONG TOOL HOLDERS

With High Speed Steel essential to high speed machining, and High Speed Steel becoming scarcer daily, it is time to make each ounce of high speed produce its absolute maximum in work accomplished . . . it is time to use ARMSTRONG TOOL HOLDERS for every operation on lathes, planers, slotters and shapers. Not only do ARMSTRONG TOOL HOLDERS "Save: All Forging, 70% Grinding and 90% High Speed Steel" making every ounce of High Speed Steel effectively equal to 10 ounces in a forged tool; they also produce more pieces per machine hour, increase accuracy and reduce spoilage.

In an ARMSTRONG TOOL HOLDER a small High Speed Cutter Bit has strength to withstand any speed or feed a machine tool can attain. Because each tool holder is correctly designed work will be more efficient, tool breakage reduced to a minimum and operation uninterrupted. There are ARMSTRONG TOOL HOLDERS for every operation on lathes, planers, slotters and shapers; for the heaviest work as well as the most delicate. See that these more efficient tools that save 90% in High Speed Steel are used wherever possible in your plant. Write for Catalog C-39

**ARMSTRONG BROS. TOOL CO.**

*"THE TOOL HOLDER PEOPLE"*

**308 N. FRANCISCO AVE., CHICAGO, U. S. A.**

Eastern Warehouse & Sales: 199 Lafayette St., New York, N. Y.

# Machine Tool Blue Book

Hitchcock Publishing Co., 508 So. Dearborn St., Chicago

*32,500 This Issue* *Volume 37, No. 11*

NOVEMBER 1941

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Acceptance under the Act of June 5, 1934, authorized February 12, 1941

NBP

R. C. Van Kampen, President
J. E. Hitchcock, Vice President
M. L. Yonts, Secretary & Prod. Mgr.
Wesley G. Paulson, Editor
Robt. E. Stewart, Asst. Editor
C. E. Elzinga, Circulation Mgr.

Representatives
W. E. Hoffman, Portland, Conn.
A. E. Wailes, 55 W. 42nd St., N. Y. C.
D. B. Trott, 2187 Olive Ave., Lakewood, Ohio.
R. H. Deibler, 2461 Sleepy Hollow Drive, Glendale, Cal.
Richard J. Ferncase, 508 S. Dearborn St., Chicago, Ill.

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for
**PUNCHING**
**SHEARING**
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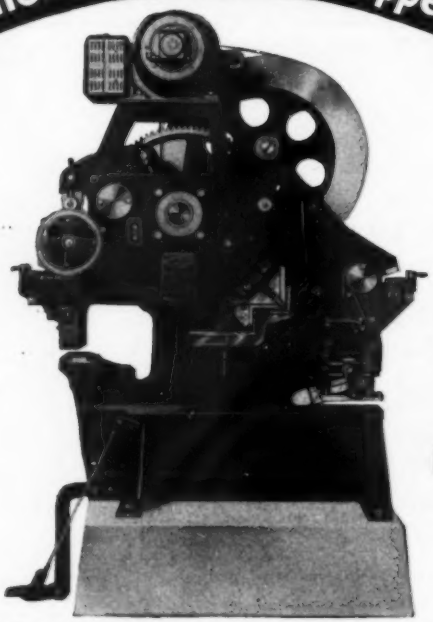
**NOTCHING**



of
**ANGLES**
**TEES**
**CHANNELS**
**I-BEAMS**
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**SQUARES**
**FLAT STEEL**

● The Buffalo Universal Iron Worker is one of the most versatile tools ever devised. Hand methods can't compare with this rugged machine in speed, accuracy and economy. Here is the dependable way to keep production humming in high gear! A wide variety of sizes. *Get full details in Bulletin 360.*

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**161 Mortimer St., Buffalo, N. Y.**
Canadian Blower & Forge Co., Ltd. Kitchener, Ontario

"Buffalo"
**UNIVERSAL IRON WORKERS**

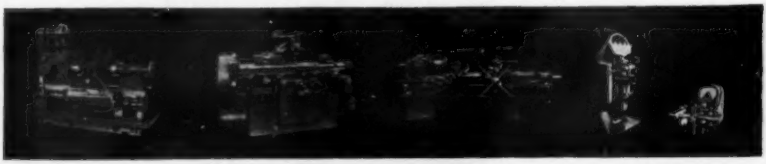
# . . A LEAF OR TWO FROM THIS BOOK

**PROFIT PRODUCING MACHINE TOOLS**

Manufacturers of Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers.

HISTORY'S lessons show us clearly that it pays to look ahead — not merely one step ahead — but a step beyond that. Today everyone agrees our first objective is victory. Versatile, rigid, precise and highly productive Jones & Lamson equipment will speed our war efforts — and tomorrow, when this emergency is over, your same Jones & Lamson machines will enable you to take the next logical step — toward sound peacetime profits based on rock bottom production costs.

**JONES & LAMSON MACHINE CO.**
**SPRINGFIELD, VERMONT, U. S. A.**



Fay Automatic Lathes | Automatic Thread Grinders | Ram & Saddle Type Universal Turret Lathes | Optical Comparators

# HOW TO *Economically*

THE CINCINNATI MILLING MACHINE CO.

# GRIND SMALL LOTS

# ON A CENTERLESS

NO STEP-CHILDREN are more neglected than small quantities in the average shop. Yet with a little thought and planning, those 25 and 50 lots will make a much better showing on the cost cards.

Consider the single operation of precision finishing, for example. One shop, having manufacturing quantities varying from 25 to 500 pieces, employs the CINCINNATI centerless method of grinding to obtain the lowest cost. For quantities like this, the margin of profit depends upon the observance of a few basic production principles. Here are the two most important ones:

First, group the parts according to thru-feed and infeed. It takes less time to change the set-up from one thru-feed job to another than to change from thru-feed to infeed and vice versa. Second, arrange the parts in order of declining diameters, starting with the largest. In this manner, set-up time may be reduced to as low as 15 minutes.

The complete story is contained in a circular entitled "Centerless for Small Lots," publication No. G-472 You may obtain a copy of it, with a machine catalog (G-456 for the No. 2 Centerless and G-438 for the No. 3 Centerless) by writing to the address given below

CINCINNATI

# SET 2, 3 OR 4 RIVETS AT ONCE AND WATCH YOUR PRODUCTION JUMP!

YES... you *can* double and treble your production rate and lower production costs at the same time, with Chicago Multiple Rivet Setters. Versatile, automatic Chicago Riveters are made for a wide variety of uses in both light and heavy duty types.

• • •

*Write for Special Automatic Rivet Setter Bulletin or submit blue print or sample assembly for recommendations.*

THE Model 55 (illustrated) which automatically feeds, inserts, and clinches two rivets at each stroke of the machine, has adjustable centers which are easily and quickly set.

**Chicago RIVET & MACHINE CO.**

**9610 West Jackson Blvd., Bellwood, Illinois (Chicago Suburb)**

Tubular and Split Rivets in All Rivet Metals

Automatic and Manual Rivet Setters for One to Four Rivets at a Stroke

# GET THE *MOST* OUT OF YOUR CUTTING TOOLS!

Norton research has developed the correct wheels for every tool grinding job and Norton engineering service is ready to assist with the correct grinding methods.

## *Sharpening high speed steel tools?*

**First, specify the patented Norton "B-E" bond. Which one of the Alundum abrasives—regular, 38 or 57—will depend on the type of tool.**

## *Sharpening carbide tipped tools?*

**Use the strong, long-lived Norton metal bonded diamond wheel for single point tools; the Norton resinoid bonded diamond wheel for multi-blade tools.**

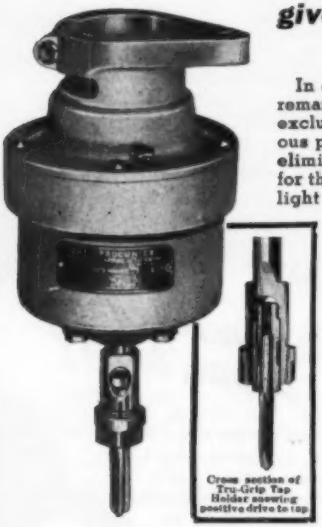
## *Finishing dies and molds?*

**Nearly 200 standard shapes and sizes of Norton Mounted Wheels and Points to select from—fast cutting 38 Alundum abrasive, stainless steel spindles.**

NORTON COMPANY, WORCESTER, MASS.

**NORTON ABRASIVES**

# New TAPPING HEADS and New TAPPING MACHINES

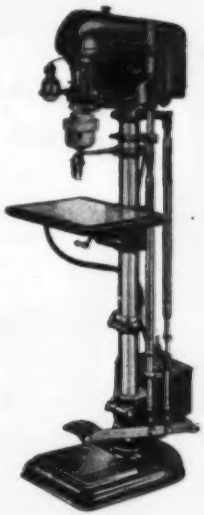



## *give you Accuracy at LOW-COST!*

In gruelling tests on actual production work—this remarkable new High-Speed Tapping Head with the exclusive "Tru-Grip" Tap Holder has broken numerous plant records for speed of tapping, accuracy and elimination of tap breakage. There are definite reasons for this: The Tru-Grip Tap Holder is so compact and light (weighs ⅓ of conventional tap holders) that fly wheel effect is reduced to a minimum. The Tapping Head offers dry, double cone friction clutch that won't wear, can't absorb oil and makes bottom tapping easy-three-point balanced heat-treated gear reversing mechanism that distributes pull and greatly reduces strain—and many other important features.

## *Send Coupon for*

full details, description and prices on complete line of Procunier Precision Tapping Heads, the new Tru-Grip Tap Holder—and full line of Procunier Universal Tapping Machines, hand, foot, or air-operated.



This new Procunier Universal Tapping Machine embodies revolutionary features that increase tapping output—and greatly increase tap life. These include: 1. Four speeds, ranging from 390 to 2050 R. P. M., efficiently handle jobs for which conventional high speed tapping machines are inadequate. 2. One machine handles tap sizes from No. 2 to ½" through two interchangeable heads. 3. Extra long Spiral Compensating Springs conveniently located, with wide range handscrew adjustments, maintains pre-set tap feeding and reversing pressures INDEPENDENT OF OPERATOR.

# PROCUNIER

**SAFETY CHUCK COMPANY**
**14 S. Clinton St.**
**Chicago, Ill.**

Procunier Safety Chuck Co.
14 S. Clinton St., Chicago, Ill.

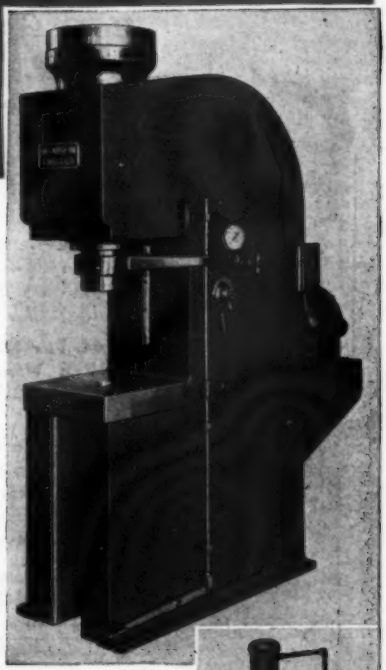
Send me Bulletins on: / / Universal Tapping Machines. / / High Speed Tapping Heads / / Tru-Grip Tap Holder.

Name.....

Address.....

City.....State.....

# Adapted to Many Press Operations . . . and Designed for Simple Handling and Control



These recent examples of Hannifin Hydraulic Presses illustrate two features of great importance in meeting today's production needs:

Simple, compact, sturdy construction.

Controls designed to make the most of the operator's skill by simplifying control operations and the handling of work. They are delivering fast, easily handled production on press-fit assembly, forming, straightening, and similar operations.

Hannifin press construction, with welded frames, built-in hydraulic power units, and sensitive, accurate control, permits flexibility in design to meet individual needs. Table construction, gap, reach, and ram stroke are readily modified in Hannifin standard size presses to adapt the performance to your production needs. Ram stroke is adjustable to avoid unnecessary up-travel of ram.

Hannifin engineers will provide recommendations upon receipt of your specifications, or press bulletins will be sent upon request.

•

**Hannifin Manufacturing Company**
**621-631 S. Kolmar Ave. • Chicago, Illinois**

*50-ton general purpose hydraulic press. Stroke 14 in., reach 10 in. Both manual and foot control. Adjustable maximum pressure. Adapted to a variety of production operations.*

*75-ton standard 4-column hydraulic press, 36 inches between columns. Alternate hand or foot operated push-button control.*

## HANNIFIN Hydraulic Presses

MOUNTING DIMENSIONS FOR MACHINES OF

# Special Design Rush!

**LARGE ELECTRICAL PLANT SWINGS OVER TO DEFENSE PRODUCTION—THREE WEEKS AHEAD OF SCHEDULE—USING SPECIAL TORQ DRIVES.**

*Type 4 SG TORQ-QUA-MATIC for Shaper. Compact motorizing unit affording rapid speed change. Note convenient location of control lever. All units powered by sturdy, trouble-free TORQ MOTORS.*

The old 10x36 grinders couldn't keep up. New grinders couldn't be delivered in time, nor our standard equipment in less than five weeks. But Torq engineers solved the problem.

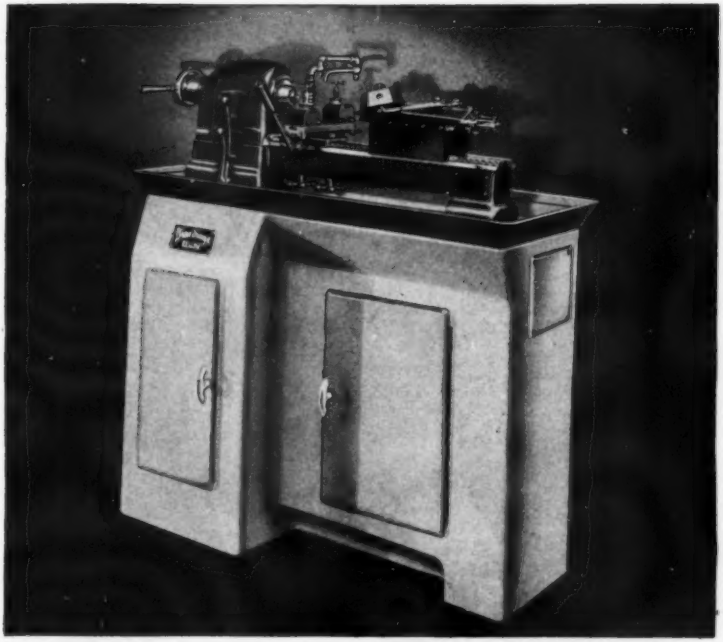
They designed and installed special duties for spindle, work-head, feed and pump. Delivery was made in TWO weeks—putting the plant into production three weeks ahead of schedule. The increased output paid for the special work in the first three days of operation.

**Would you like service like that? Then take advantage of our RUSH JOB department—set up just to handle your special jobs FAST. Write us about your problem TODAY.**

THE TORQ ELECTRIC MFG. COMPANY

6605 CARNEGIE AVENUE • CLEVELAND, OHIO

# Elgin



*Precision*

# HAND SCREW MACHINES

**ELGIN TOOL WORKS**

Division Of HARDINGE MANUFACTURING CO.

1772 BERTEAU AT RAVENSWOOD AVE. — CHICAGO, ILL.

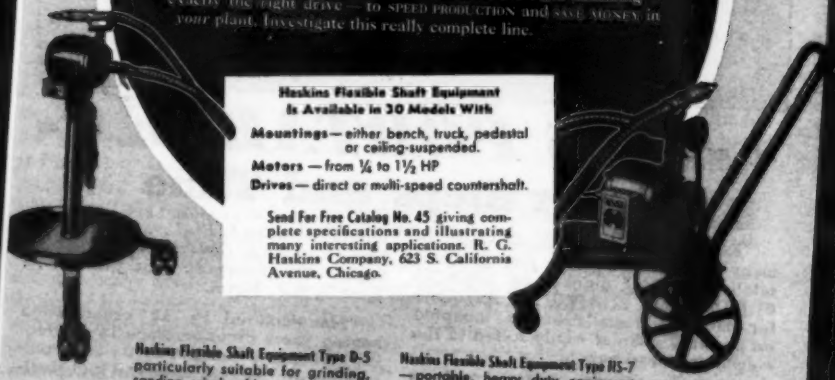
JOIN
AMERICAN RED CROSS

# 30 ANSWERS
## TO THE *Question of the Day!*

"CAN WE step production up and hold costs down?" That's the question keeping many a harried production man awake these nights.

If it's a question of grinding, sanding, polishing, filing or wirebrushing, Haskins has the answers! *Thirty different types* of Flexible Shaft Equipment. Each type particularly designed for a particular range of operations. Every type engineered to do *more* work in *less* time at *lower* upkeep costs than anything else in the field!

One of these 30 different types of Haskins Flexible Shaft Equipment has exactly the right *motor* — exactly the right *mounting* — exactly the right *drive* — TO SPEED PRODUCTION and SAVE MONEY in *your* plant. Investigate this really complete line.



**Haskins Flexible Shaft Equipment Is Available in 30 Models With**

**Mountings** — either bench, truck, pedestal or ceiling-suspended.

**Motors** — from ¼ to 1½ HP

**Drives** — direct or multi-speed countershaft.

**Send For Free Catalog No. 45** giving complete specifications and illustrating many interesting applications. R. G. Haskins Company, 623 S. California Avenue, Chicago.

**Haskins Flexible Shaft Equipment Type D-5** particularly suitable for grinding, sanding, wirebrushing and buffing in preparing metal surfaces and welded areas for lacquer finishes. ½ HP, ball bearing motor delivers 3425 RPM through a direct drive. Also available with bench plate mounting.

**Haskins Flexible Shaft Equipment Type HS-7** — portable, heavy duty equipment with a 4-speed (up to 3100 RPM) Timken bearing countershaft, for a variety of grinding, sanding, wirebrushing and polishing operations. 1 HP, ball bearing motor provided with a 360° ball bearing swivel.

# HASKINS

FLEXIBLE SHAFT EQUIPMENT

# AMMCO 7" SHAPER

*"A precision machine of a thousand uses"*

## - - IT'S PORTABLE - -

## Saves Steps and Time

Don't tie up a big shaper when so many jobs can be done just as accurately and much quicker on AMMCO 6' PRECISION SHAPER . . . Available for stationary installation or mounted on portable cabinet easily rolled to the mechanic's workbench.

Features of this Shaper include quick adjustment of stroke, ram position, tool head, table height, table support, feed and speed . . . The maximum length of stroke is 7¼" . . . Table has five cross feeds (reversible) . . . Countershaft has three-step cone pulley . . . ¼ or ⅓ H.P. Motor.

Manufactured by an organization having years of experience in producing precision machinery . . . Recommended by leading machine tool dealers and machine tool manufacturers.

*Write for Specifications and Prices.*

**AUTOMOTIVE MAINTENANCE MACHINERY CO.**

**2106 Commonwealth Avenue, North Chicago, Ill.**

**JACOBS CHUCK**: ½" to ⅝" capacity or No. 1 Morse Taper.

**SPINDLE SPEEDS**: four — from 600 to 5000 r.p.m. with 1740 r.p.m. 1½ h.p. single phase motor. Eight speeds — from 600 to 10,000 r.p.m. with two-speed 1740-3500 r.p.m. three phase motor with push-button control.

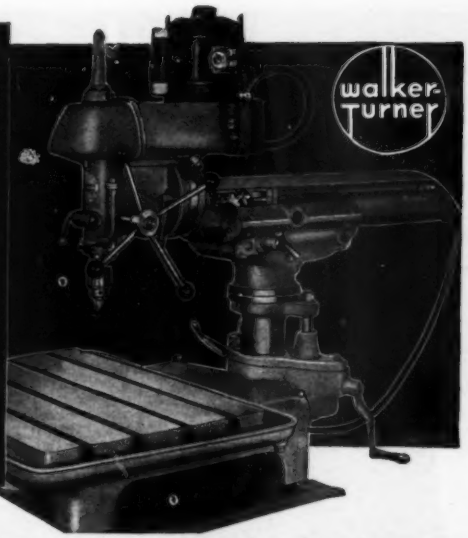
**OVERALL DIMENSIONS**: height 72" width 31" depth 58". Shipping weight 450 lbs.

**BALL BEARING MOUNTED**: sliding ram carried on 8 precision ball bearings with provision for take-up for wear.

**SIX-SPLINE SPINDLE**: four precision ball bearings. Drive pulley straddle-mounted to eliminate belt strain.

**CAPACITY**: permits drilling to center of 62" circle. Maximum distance nose of chuck to table 13½". Vertical traverse of spindle 3¾". Column diameter 3¼".

**MISCELLANEOUS**: drill may be tilted to 45° right or left. Drill press head cast in one piece. Run-out accuracy guaranteed within all industrial standards. Extremely rigid when locked in drilling position. Minimum deflection.




# THE NEW WALKER-TURNER RADIAL DRILL PAYS ITS WAY IN ANY SHOP

At last—a Radial Drill of the most practical design and construction, for **less than one-fourth** what you have been paying for this type of machine. This useful production unit meets all reasonable specifications for accuracy within the limits of its capacity. Designed for industrial use, its adaptability makes it a **profitable investment for any shop.** The remarkably low price of **$325** (with motor) F.O.B. Plainfield, N. J., is made possible by W-T volume production, which also permits reasonably **prompt delivery.**

## SEND FOR INFORMATION

WALKER-TURNER CO., INC.
1751 Berckman Street, Plainfield, N. J.

**Please send me complete information regarding the new Walker-Turner Radial Drill.**

Name _____ Title _____

Company _____

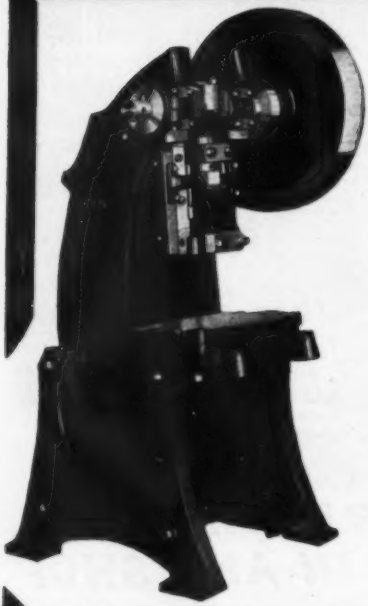
Street _____

City _____ State _____

walker-Turner

## WALKER-TURNER PRODUCTS

DRILL PRESSES • LATHES • BAND SAWS • BENCH SAWS • TILTING ARBOR SAWS
JIG SAWS • RADIAL SAWS • RADIAL DRILLS • BELT AND DISC SURFACERS
GRINDERS • JOINTERS • SPINDLE SHAPERS • FLEXIBLE SHAFT MACHINES • MOTORS



# "TOPS"

## FROM EVERY STANDPOINT

Sturdy, dependable Marshalltown Presses offer you THE MOST FOR YOUR MONEY—they are engineered and built for BETTER PRODUCTION and LONGER LIFE. Among many proven advantages are (1) more die space; (2) chrome nickel cranks, and (3) wrist pin connections. The Marshalltown Line includes inclinable presses from 5 to 70 ton capacity.

# MARSHALLTOWN PRESSES

★ BETTER PRODUCTION ★ LONGER LIFE

*Get the FACTS today about Marshalltown Presses. It will pay you well to send for fully illustrated and descriptive literature.*

**MARSHALLTOWN MFG. CO.**

900 E. NEVADA ST., MARSHALLTOWN, IOWA

# ARTER

## Rotary Surface Grinders

## at Wright

### GRINDING CAMS FOR "CYCLONE" ENGINES

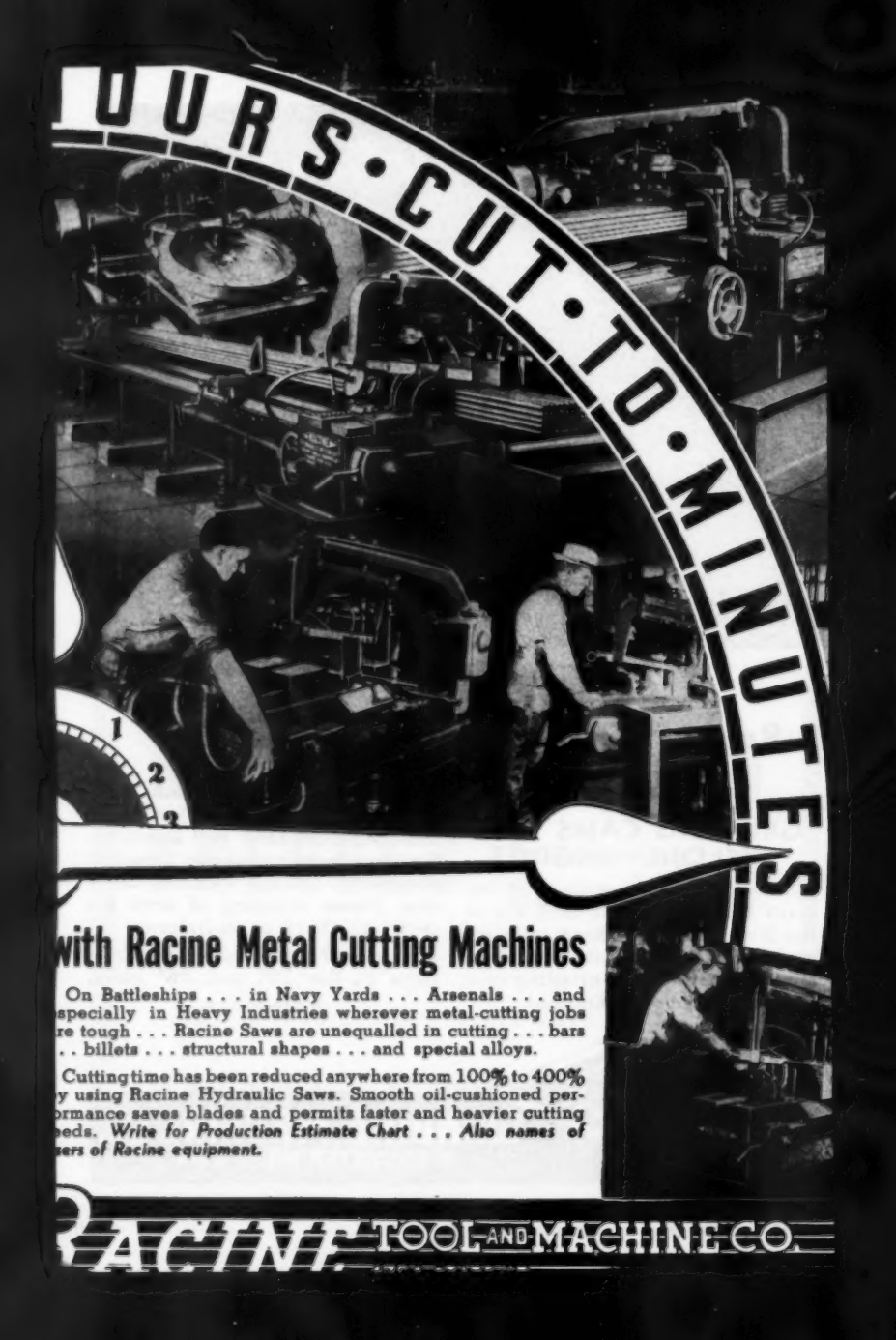
Illustrated above are three of the many Model A3 Arter Grinders at the Wright plant. These grinders give the precision and close tolerances demanded for grinding cam faces for "Cyclone" Engines.

Work spindle construction, employing selected, precision, double-row, preloaded ball bearings, top and bottom, insures "aircraft accuracy." Great vertical capacity allows grinding of work directly on chuck or on fixtures.

Let us send you detailed specifications on the 12" and 16" sizes.

*Write today.*

ARTER GRINDING MACHINE CO.
WORCESTER, MASS. U.S.A.




## with Racine Metal Cutting Machines

On Battleships . . . in Navy Yards . . . Arsenals . . . and especially in Heavy Industries wherever metal-cutting jobs are tough . . . Racine Saws are unequalled in cutting . . . bars . . . billets . . . structural shapes . . . and special alloys.

Cutting time has been reduced anywhere from 100% to 400% by using Racine Hydraulic Saws. Smooth oil-cushioned performance saves blades and permits faster and heavier cutting speeds. *Write for Production Estimate Chart . . . Also names of users of Racine equipment.*

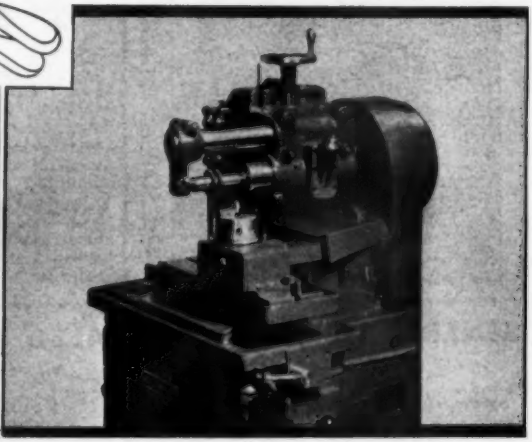
**RACINE TOOL AND MACHINE CO.**

# WINGS to production of Aircraft Parts

## AIRCRAFT PARTS

*whose production can be accelerated on the U. S. Multi-Miller*

Engine Parts—Exhaust
Supports—Carburetor
Parts—Fuel Pump
Parts—Turnbuckle
Forks—Rocker Arms
Turnbuckle Eyes
Rod End Clevis
Propeller Contacts
Rod End Bearings, Etc.



**Here is a milling machine designed to meet the expanding requirements of the aircraft industry—fully automatic in operation—precision built to turn out precision work—low changeover time.**

**Multi-Miller versatility is illustrated by the variety of out-of-the-ordinary applications, such as cutting off, spur gear cutting, contour milling, grinding, step milling, rotary milling and continuous milling, performed on these machines, in addition to conventional milling operations. Then, too, the Multi-Miller can be used for hand milling as well as for these automatic operations.**

**An example of Multi-Miller production of an aircraft part is the tough steel (SAE 2330) turnbuckle fork illustrated above. A 180° index table holding two fixtures enables the operator to load during the cutting cycle. Production is 125 per hour.**

***Let us demonstrate Multi-Miller economies on your parts.***

MILLER PRODUCTS

**U.S. TOOL COMPANY, INC.**
AMPERE (EAST ORANGE) N. J., U.S.A.

MAKERS OF
U. S. MULTI-MILLERS
U. S. MULTI-SLIDE MACHINES
U. S. AUTOMATIC PRESSROOM EQUIPMENT—U. S. COMPOUND WHEEL TOOLING ATTACHMENT
U. S. DIE SETS

# No. 16 TOGGLE PUNCH PRESS

The No. 16 TOGGLE with large die space is suitable for punching and shearing tie plates, punching and straightening splice bars, also for general manufacturing press, punching and shearing articles. Drive is mounted inside of frame.

The Press is equipped with magnetic or air clutch. This is a high speed heavy duty Press for many applications.

## GENERAL DIMENSIONS:

| | No. 16 | No. 16A | No. 16B |
|---|---|---|---|
| Face of slide, right to left | 43" | 53" | 62" |
| Face of slide, front to back | 24" | 26" | 26" |
| Die space, slide down | 20" | 20" | 20" |
| Stroke; Standard | 3" | 3" | 3" |
| Maximum | 5" | 5" | 5" |
| Face of table, right to left | 53" | 60" | 66" |
| Face of table, front to back | 24" | 26" | 26" |
| Capacity | 700T | 850T | 1000T |
| Strokes | 40 | 35 | 30 |
| Depth of throat | 15½" | 15½" | 15½" |
| Weight | 76,000 | 82,000 | 88,000 lb. |
| Motor required Horse Power | 20 | 30 | 40 |

**BEATTY MACHINE & MANUFACTURING CO.**
**HAMMOND, INDIANA**

## ALSO BUILDERS OF

Punches: Single and Double—"C" Frame
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The CoPun Shear
(Cope Punch Shear)
Vertical Bulldozers
Spacing Tables
Hydraulic Press Brake and Flanger.
Hydraulic Presses.

Surface finishing a "Wright" Master Rod with Jarvis Multispeed flexible shaft equipment
Radiing holes in a "Wright" steel crankcase

★ **As defense production gains momentum, production managers and engineers appreciate the advantages of a source where equipment for top-speed production has been tested and proved—in advance of their needs.**

**Wittek *Automatic* Roll Feeds provide an improved and simplified method of punch press operation that insures rapid feeding under all conditions. Wittek Roll Feeds handle any type of coiled strip stock and are made in single roll, double roll, and compound types with straighteners, in models to feed in any of four directions.**

**Wittek *Adjustable* Reel Stands provide automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and back lash of stock.**

**If your production problem involves feeding coiled stock to punch presses, it may be solved by consulting us. Your inquiry will be given immediate attention. Send for complete descriptive catalog.**

**WITTEK MANUFACTURING CO.**
4305 W. 24TH PL. CHICAGO, ILLINOIS, U. S. A.

# DoAll

## ACE OF BAND SAWS

## DO ALL SAWS FULL SPEED AHEAD!

Without an argument, these efficient little metal eaters will go to work on any kind of tough metal up to 10" thick and turn out a job to be proud of in better-than-record time.

And—you should see their smooth performance on some of the hard ones like cold rolled nickel, laminated low carbon sheet steel, Neoprene, aluminum alloy, bronze, semi-steel castings, etc.

### 42 STANDARDIZED SIZES

DoAll Band Saws come in Raker tooth, heavy set, A temper—in every size approved by the OPM Ruling—each one the last word in saw perfection.

*FREE BOOKLET—"Actual Performance Records of DoAll Saws" is well worth your reading. It's short and to the point.*

*Send for copy.*

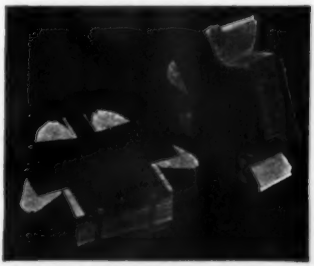
## THE DO ALL COMPANY

**1206 Thacker St., Des Plaines, Ill.**

Associated with Continental Machines, Inc., Minneapolis

Punch Frames of hot rolled steel cut in 30 minutes with ⅝" DoAll Saw (41 lineal inches). McHugh Bros., Rockford, Ill.

DoAll Saws do expert internal and external cutting on all kinds of die parts at Koller Die & Tool Co., Milwaukee, Wis.

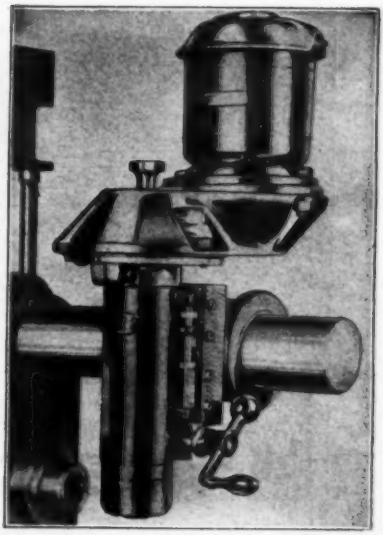


Shows how 40 to 60 metal sheets are clamped together and cut at one time with a DoAll Band Saw.

# HALCO
# Universal Head

## Speed-Accuracy-Dependability

FOR HIGH SPEED MILLING, DRILLING, BORING AND COUNTER BORING ON ANY ANGLE



The Halco Hi-Speed Universal Milling attachment is designed to meet the demand for greater efficiency, better workmanship, and for speed in building tools, dies, jigs, fixtures, wood and metal patterns, and other machine products where accurate and fast machining are of prime importance.

With its 4 inch vertical travel, many drilling, milling, boring and facing operations can be accomplished in one setup. The total weight is approximately 90 pounds, and it can be easily mounted by one man.

The Halco Head is engineered and built to precision limits in a modern shop by skilled mechanics. All parts and materials built into this machine are the very best obtainable and unconditionally guaranteed for six months.

Motor of heavy duty type, 1/3 H. P., 110 volts, 60 cycle, with plug-in cord and switch. Easily reversible for L. H. cutters. Five speeds 350 to 2900 R. P. M. Also 10 speeds 125 to 2900 R. P. M. available at extra cost.

**PRICE $195.00 In U. S. A.**

**With 10 Speed Back Gear**
**$47.50 Extra**

Sold direct, factory to you, or your nearest dealer. Many machines in use. Tried and tested in machine plants for 1-1/2 years. Each head is unconditionally guaranteed for six months.

*Write for folder giving details or order now for quick delivery.*

**HALCO PRODUCTS CO.**

**14230 BIRWOOD AVE., DETROIT, MICHIGAN**

# AMERICAN

## PRODUCES *for Defense*

**AMERICAN has produced broaching machines and tools which aid manufacturers in the production of all types of first line defense equipment.**

**AMERICAN broaching equipment is producing flats on the ends of tank track connectors. AMERICAN equipment is used by aircraft manufacturers for broaching propeller hubs, for broaching faces of split line bearings and many other operations. Openings in bearing cages for main crankshafts in torpedo boats are AMERICAN broached. Also on our roster are transmission and differential gears used in army "jeeps" and half-tracs. In addition to the above, AMERICAN developed the hydraulic rifling machine used for rapid rifling of 105 MM Howitzer barrels as well as rifling machines for various cannon down to and including the 20 MM Aircraft Cannon. Early in "Defense" AMERICAN supplied broaching equipment for production manufacture of receiver forgings for the Garand rifle. It is through this wide variety of experience that AMERICAN is able to produce faster, finer and more accurate broaching machines and tools than have been turned out in the history of broaching !**

**AMERICAN BROACH & MACHINE COMPANY**

ANN ARBOR, MICHIGAN, U. S. A.

BROACHING MACHINES, PRESSES, BROACHING TOOLS, SPECIAL MACHINERY

# ZERO HOUR

## THIS IS NO TIME TO *WASTE* TIME

We have reached the "zero hour" in America's Defense Production. The "Battle of the Shop" is on. An all-out effort must be made to increase production. Time must be saved and not wasted.

R and L Tools are especially helpful in aiding this drive.

The R and L Turning Tool saves time in many respects. It does the same work that 14 different tools are now doing for you. Time is saved because you don't have to waste time looking for other tools. It can be changed from right to left or left to right in 10 seconds. The only tool on the market of its kind. Time is saved because you don't have to waste time on set-ups. It performs many operations at once, such as: turning shoulder concentric with stock diameter; turning two diameters while drilling or reaming; turning one diameter—chamfering two corners, facing end of part along with drilling or reaming; turning and forming special shape or end of part while drilling or reaming; drilling and chamfering; pointing work concentric with turned diameter.

*Write for more information, or, better yet, to save time, order one today.*

**R and L Tools**
**1827 BRISTOL STREET**
**NICETOWN, PHILADELPHIA, PA.**

# NEW Carbide Tool GRINDER

## with Features you have *always* wanted!

This DELTA-Milwaukee carbide tool grinder incorporates the things you have always desired in a machine of this type. It is equipped with one No. 60 Silicon-carbide wheel, and one No. 120 grit Silicon-carbide wheel, the first for preliminary grinding—the second for producing a perfect cutting edge. So accurate is the machining on this grinder that it runs absolutely true, free from vibrations so that accurate, delicate grinding can be done.

**SPECIFICATIONS**

This new Delta Carbide Tool Grinder has 13½"x8" tables with ½"x7/16" grooves for fixtures. Tables tilt 30° toward wheels and 45° away from wheel. Supplied with 1 No. 60 Grit and 1 No. 120 Grit Silicon Carbide Wheel. Wheel sizes: 1" wide x6" in diameter with a 1" face, and a 1½" hole. (Standard Diamond Wheels can also be used).

Reversible ½" H. P. motor with self-sealed ball bearings—lubricated for life. Speed: 3450 R. P. M. with surface speed of 5200 R. P. M. Furnished with 1 water pot and adjustable light fixture. Sub-base is removable for easy cleaning. Reversing switch built into base. Available with wide range of motors to fit all needs—in choice of bench or pedestal models.

**Send for Full INFORMATION**

Fill out coupon for full details, specifications and prices on this new Carbide Tool Grinder.

Table tilts 30 degrees toward wheel. Note convenient indicator which shows exact angle at which table is set.

Easy to clean this grinder! Table and sub-base easily removed by loosening only two bolts. Sludge scraped and washed away in a jiffy.

The Delta Mfg. Co., 603-M E. Vienna Ave., Milwaukee, Wis.

Gentlemen: Send me full details on the new Delta Carbide Tool Grinders. Also send copy of latest Delta Catalog.

Name.....

Address.....

City..... State.....

**DELTA**
**MILWAUKEE**

# The New NICHOLS
# Hand Milling Machines

## Designed for Volume Production of Small Parts at LOW COST

The NICHOLS Hand Milling Machine is ideal for small part milling. Its rugged design and inbuilt accuracy make it an indispensable, modern, high production tool. It features speedy set-up in a precision machine which permits you to take full advantage of high cutting speeds.

*May we send illustrated bulletin?*

*SPECIFICATIONS*

Longitudinal Feed, 10". Transverse Feed, 7". Vertical Feed of Knee, 13½". Vertical Movement of Head, 4½". Micrometer dials on Transverse and Vertical Feeds. Spindle Speeds: — 100, 200, 600 and 1200 r. p. m.

W. H. NICHOLS & SONS

WALTHAM MASS. U. S. A.

IN THIS CORNER
AIR
O'TOOL
Rugged yet light on his toes. Simple build. Hard to beat where the going is tough.
REFEREE:
THE ROTOR ANALYST
An unbiased, practical judge of champs for licking portable tool problems.
IN THIS CORNER
HI-CYCLE
O'TOOL
Speedy! Packs a mean cost-cutter. If the set-up is right, he'll K.O. every problem in sight!

# BOUT of the O'TOOLS

## A 10-ROUND FAMILY FIGHT FOR *YOUR* BENEFIT

*The Rotor Analyst* has decided to let AIR and HIGH-CYCLE tools—his two hard-hitting production champs—have it out! Each of 10 rounds will be staged in a different plant under that plant's unique conditions. Blow-by-blow reports of this bout will help show you how to whip *your* portable tool problems.

*Would AIR or HIGH-CYCLE win in your plant?* Let the *Rotor Analyst* demonstrate each type of tool and give you an unbiased recommendation to make sure you get peak production and lowest operating cost.

*Need more portable tool punch for defense production?* The *Rotor Analyst* has a particularly attractive plan to equip you at a fraction of the cost you might expect.

*The Rotor Analyst has 65 different AIR tools and 59 different HIGH-CYCLE tools with which to solve your problems.*

THE **ROTOR TOOL** CO.

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

# The GLENCO
## COMPENSATING TOOL HOLDER

Produces true and accurate holes by correcting machine tool misalignment on hand screw machines, automatic screw machines, tapping and drilling machines of all kinds, and multiple spindles.

Available in stock are five standard sizes of holders with taper or straight shanks with capacities up to five inch tool diameters. Prompt make-ups on larger or special holders are easily accomplished and our engineers are ready at all times to assist you in solving your special problems.

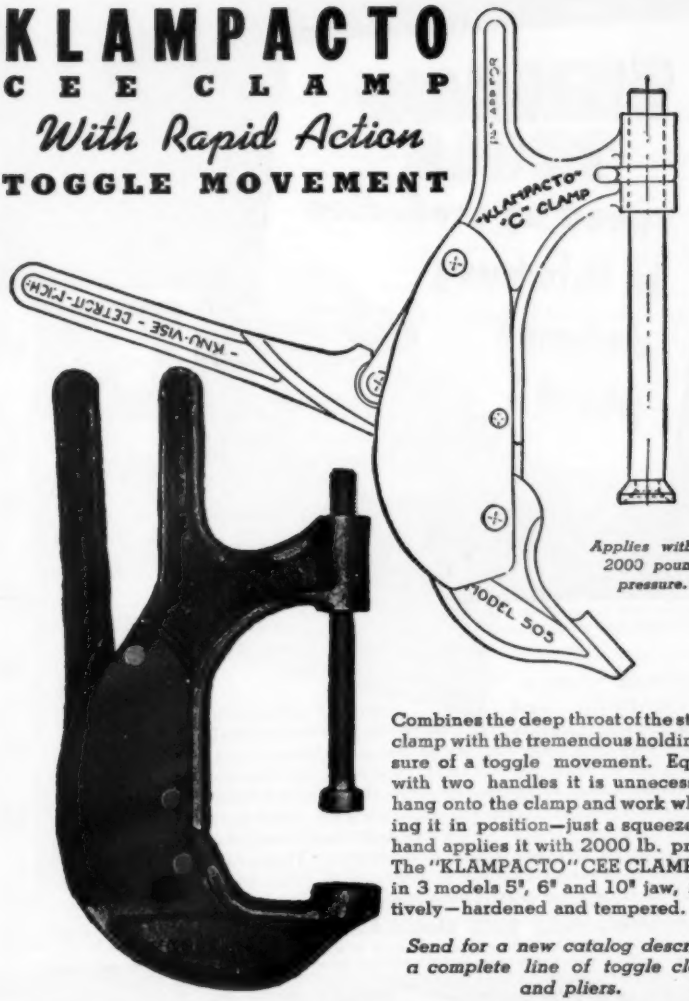
**SEND FOR BULLETINS ON ALL OUR UTILITY TOOLS**

**THE J. C. GLENZER CO., INC.**

6465 EPWORTH BLVD. DETROIT, MICHIGAN

*Utility Tools*

# KLAMPACTO
## CEE CLAMP
## *With Rapid Action*
## TOGGLE MOVEMENT




*Applies with a 2000 pound pressure.*

Combines the deep throat of the standard clamp with the tremendous holding pressure of a toggle movement. Equipped with two handles it is unnecessary to hang onto the clamp and work when fixing it in position—just a squeeze of the hand applies it with 2000 lb. pressure. The "KLAMPACTO" CEE CLAMP comes in 3 models 5", 6" and 10" jaw, respectively—hardened and tempered.

*Send for a new catalog describing a complete line of toggle clamps and pliers.*

**KNU-VISE, INCORPORATED**

**206 Grove Ave., Detroit**

*Pacific Plant:*
**7263 Melrose Ave., Los Angeles, Calif.**

# SKILSAW TOOLS

## speed up production in this busy defense plant!

Swift, easy cuts in 16-ga. channel steel are made with SKILSAW and a friction blade

EVERY kind of Skilsaw Tool is used on all these operations to get work done faster!

Skilsaw Model "G" Disc Sander smooths down welds faster. Also sands, buffs, prepares for finishes.

Skilsaw Model "SL" Disc Sander speeds up all grinding, metal cleaning, filing, surfacing on castings.

Skilsaw Zephyrplane Belt Sander swiftly removes scale and grit from metal even well.

Faster drilling is easy—even in close quarters—with compact, rugged Skilsaw Model 43 Drill.

Famous Skilsaw Model 80 Drill—quickly drills holes for handles on laminated insulated doors.

**SKILSAW TOOLS MEAN SPEED...and America *demands* speed in a plant working 95% on direct defense orders! That's why this busy factory (name on request) uses every kind of SKILSAW TOOL to save more time on more operations, to speed deliveries of Army and Navy bakery equipment, to hasten America's vital defense.**

**Are you making deliveries on schedule? Are there jobs in your plant that should be done sooner? Those are the jobs that could be done faster... with SKILSAW TOOLS. Call your distributor for a demonstration.**

**SKILSAW, INC., 5035 Elston Ave., Chicago**

New York, Boston, Buffalo, Philadelphia, Cleveland, Kansas City, Atlanta, New Orleans, Dallas, Los Angeles, Oakland, Seattle, Toronto, Canada

**SKILSAW PORTABLE ELECTRIC TOOLS**

# Featured In This Issue

**PRECISION DISC GRINDING**—is to many production officials a relatively new method, although it has been used by some plants for several years. These case studies presented by H. B. Nielsen of the Gardner Machine Co., Beloit, Wis., show typical examples of what has been accomplished in this promising field. Story begins on page.....41.

**RIFLING CANNONS** with Spiral Broaching Tools is a pertinent subject —and F. J. Lapointe of American Broach & Machine Co., Ann Arbor, Mich., tells just how it is done. Mr. Lapointe has been connected with the broaching machine and tool industry for many years. The principles involved in connection with these cannon broaching operations are based on a practical knowledge of broaching in general, and also on the spiral rifling of barrels for one-pounder cannons which were successfully broached during World War I. See page .....57.

**SHELL CENTERING** in the Conveyor Line by Frank Palmer describes a new method of centering 75 to 155 mm. shells. It involves an automatic centering machine which is installed in the conveyor line. Eliminating all lifting, it speeds operations materially. Story begins on page.....71.

**MAGNETISM** can cause a lot of worry and trouble in the Tool Shop—especially when the cutting edges of tools have halos of filing and metal chips. R. B. Annis of Indianapolis has built a great many demagnetizers of all types and sizes and tells how they can be used to advantage on all kinds of tool room work. See page.....79.

**THE "BUFFER" SCHOOL** and its Function in Apprentice Training is the subject of M. G. Heuer's offering. Based on training methods used at the Harnischfeger Corp., Milwaukee, it gives another slant on this topic which is of vital importance at the present time. See page .....97.

**REDUCING HARDENING REJECTS** tells about the new method of inductive hardening now used at the Chicago tractor plant of the International Harvester Co., on crankshafts for Diesel and gasoline engines. A reduction in heating time from 12-hours to less than 5-minutes emphasizes the importance of this development. See page.....107.

**DESIGNERS' REQUIREMENTS** in the way of Good Drafting Tools is H. F. Williams' topic. Incidentally, Mr. Williams is a Designing Engineer and knows the requirements from practical experience. He will be glad to answer any questions on this subject addressed to him in our care. See page.....113.

**FABRICATING** Mechanical and Structural Parts by Arc Welding contains many suggestions that may be adopted by other industries. Wallace White's story is based on material supplied by Lincoln Electric Co., Cleveland, O. See page .....137.

**LET'S TALK SHOP** includes many interesting items, such as a new application for bending presses; data on carbide tools; a weld tester made by welding students, etc. See page.....147.

**WHAT'S NEW** presents many of the very latest developments in machine tools, production equipment and accessories in the section commencing on page .....171.

**SUB-CONTRACTING** — Additional plants now available; see pages....258-9.

**MECHANICS THROUGH THE AGES** —Blue Book's exclusive picture page ....251.

# ACCURACY

## FOR THE FIRST LINE OF DEFENSE

LOOKING at today's whirring defense program, the first picture is that of speed—and tremendous mass production. Behind every such picture there is one of the tool room—the *first* line of defense—where tools and fixtures for the production line are designed and built. It is in this picture, where measurements are reckoned in split thousandths of an inch, that you will find South Bend Lathes.

Sound design, expert workmanship and quality materials give South Bend Lathes extreme accuracy for precision tool and gauge work—smooth power and speed for efficient production—versatility for economical change-overs.

It is for these reasons that South Bend Lathes are demanded in ever-increasing numbers by some of the nation's key industrial plants, and by the Army and Navy. The South Bend Lathe Works is prepared to meet the demand—and is meeting it every day—with the same quality, same high standards which have been maintained through 34 years of fine lathe manufacture.

South Bend Lathes are made in five sizes: 9", 10", 13", 14½" and 16" swing, 3' to 12' bed lengths, in Toolroom or Manufacturing types, with individual motor drive. Write for a copy of our new Catalog 100-A and the name of your nearest dealer.

SOUTH BEND LATHE WORKS

196 EAST MADISON STREET, SOUTH BEND, INDIANA, U. S. A.

LATHE BUILDERS SINCE 1906

# Editor's Page

EXPRESSING appreciation of the Tool Industry's accomplishments thus far, Mason Britton of the O.P.M. addressed a stirring appeal for many more man-hours to the National Machine Tool Builders Association at their recent Chicago meeting. And the Tool Builders responded with a unanimous rising vote.

Briefly, Britton traced Hitler's pattern of aggression, commencing with the seizure of Austria, and the hypocritical assertion that was all he wanted. Since then, Nazi mechanized might has overrun and pillaged more than a score of countries . . . and it's evident that superior mechanized force is the one hope of stopping worldwide aggression.

Mr. Britton urged expansion of second and third shifts . . . and increased sub-contracting . . . the use of any and every possible method of stepping-up production of critical tools. Many companies are already working two long shifts or three eight-hour shifts. How many though, have as many workers on the second and third shifts as on the first? Admittedly it's difficult, but it should not be impossible to find more men for the night shifts. It will be done somehow . . . and the tools will be ready when they're needed, for accomplishing the "impossible" has become a regular habit of the Machine Tool Builders. For production with available facilities . . . for resourcefulness, energy and loyalty . . . for freedom from labor troubles and strikes, the Tool Builders have repeatedly set the pace for all of the defense industries.

Wesley G. Paulson

# "KEY PEOPLE"—*When You Need Steel*

Ryerson's function is not only to supply your steel, but to deliver it on time. From the moment the Ryerson switchboard flashes your incoming call until the steel is laid down in your plant, a corps of helpful, intelligent employees well-trained in the Ryerson "Immediate Steel" tradition are at your service.

The likeable young women at the switchboard, phone-order salesmen, dispatchers, crane operators, skilled warehousemen who cut, shear and shape stock sizes to fit your specifications, truck drivers—all of them are key people at Ryerson—key people in *your* service, when you need steel!

Although the National Defense program and essential industries come first, we are putting forth every efforth to serve all Industry to the best of our ability. Naturally, many sizes and certain products are out of stock. However, for the most part you can depend on Ryerson for immediate shipment of a wide range of steel products.

For best service during this period of heavy demand, "open" orders are advisable. Stock List sent promptly on request.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

**RYERSON** *Certified* **STEELS**

RYERSON CERTIFIED STEELS

# Case Studies in Precision Disc Grinding

By H. B. NIELSEN

ALTHOUGH Precision Disc Grinding has been performed in some plants for several years, it is, to many production officials still a relatively new method, the full possibilities of which are not always appreciated.

Investigating, we find that a large number of jobs—most of them of the parallel surface type—are being ground to very close limits on Gardner Precision Disc Grinders. Any machine that can grind parts on a production basis within a few "tenths" certainly qualifies for recognition as a true precision tool.

In the line up of these modern units, we find sturdy, rigid machines of more than average weight, embodying many advanced features of design plus exacting workmanship. We also find many ingenious methods and fixtures for feeding and handling the work.

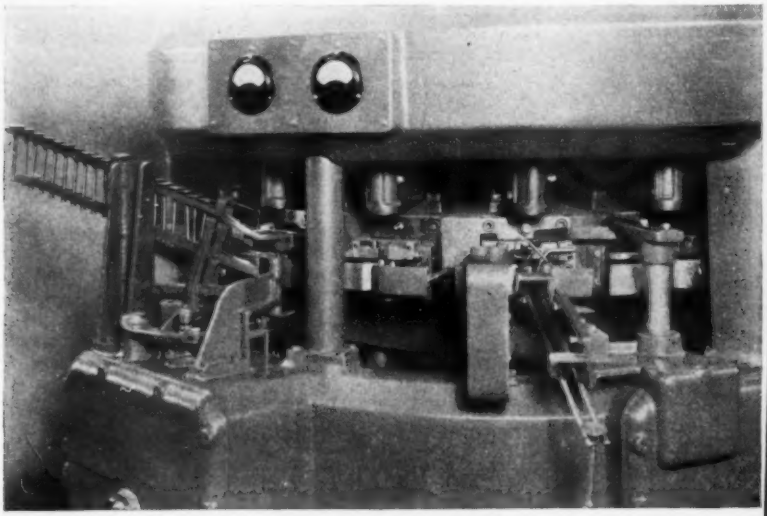


Fig. 1—Finish-grinding stem ends of automotive valves on a two-head, special purpose machine.

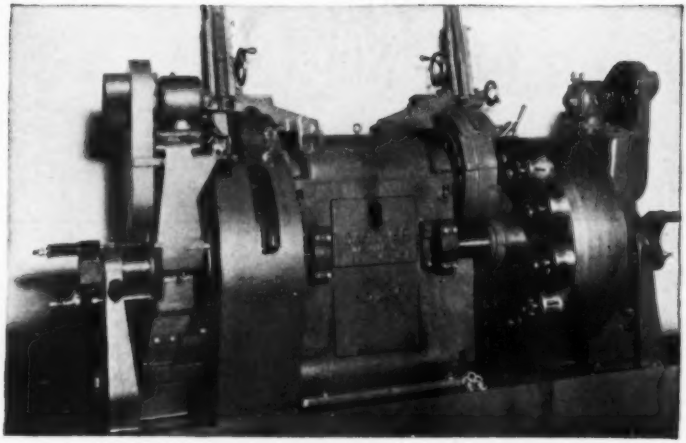


Fig. 2—Using two rotary work-carriers on opposite ends of a 30" single spindle grinder.

For instance, let's consider the job of finish-grinding the stem ends of valves on a two-head special purpose machine, at a rate of 30 to 35 per minute. Each of the two heads mounts an 18" diameter grinding wheel operating in a horizontal plane. The valves are carried over the cutting members by the rotary carrier visible in the closeup view (Fig. 1). Chute type loaders and unloaders are designed to perform these operations automatically.

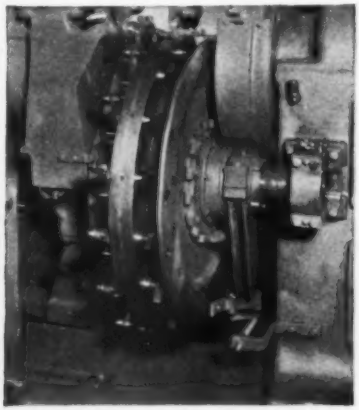
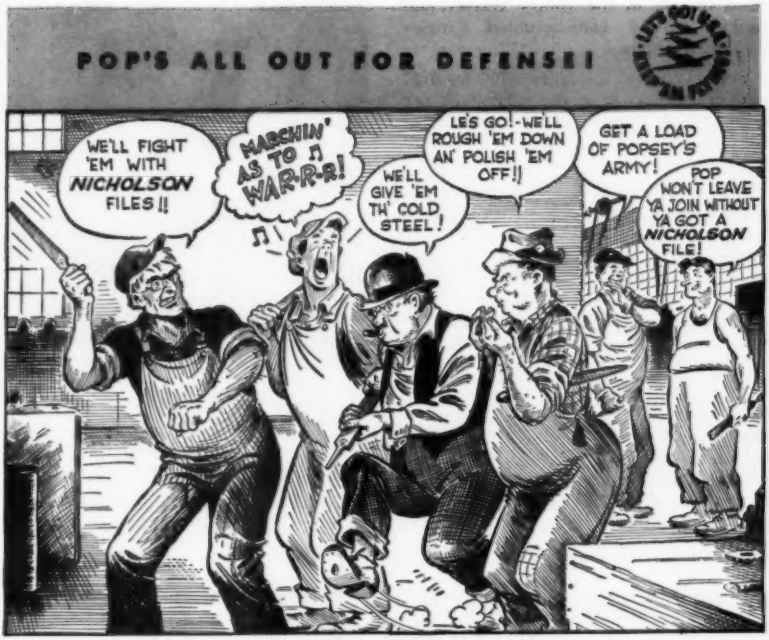


Fig. 3—Lever shaft studs are ground at left end of machine shown in Fig. 2.

One wheel performs a roughing operation, removing .004 to .005" stock, while the second or finishing wheel removes a final .001". A noteworthy feature is that the valves are ground within .0003" for squareness with stem and seat, and plus or minus .00075" for uniformity of length, measuring from the ground seat.

Often a standard single - spindle grinder may be equipped with rotary work carriers on one or both ends, thereby converting the machine into a high production semi-automatic tool. A large No. 230 unit, shown in Fig. 2, grinds two small automotive parts. Extreme accuracy is demanded, which explains the weight and rigidity of the machine.

Lever shaft studs are ground on one end of machine, as shown in Fig. 3. Of soft steel, these parts are held in hard-


POP'S ALL OUT FOR DEFENSE!
WE'LL FIGHT 'EM WITH NICHOLSON FILES!!
MARCHIN' AS TO WAR-R-R!
WE'LL GIVE 'EM TH' COLD STEEL!
LE'S GO!-WE'LL ROUGH 'EM DOWN AN' POLISH 'EM OFF!!
GET A LOAD OF POPSEY'S ARMY!
POP WON'T LEAVE YA JOIN WITHOUT YA GOT A NICHOLSON FILE!

IN THOUSANDS of plants and in the hands of hundreds of thousands of patriotic workers, Nicholson and Black Diamond files are doing a tremendous bit in the great cause of National Defense.

There is scarcely a metal part or assembling step in the construction of ships, planes, tanks, trucks, guns and heavy shells that does not require some hand-filing. And because of the speed and accuracy required under today's fast-production pressure, the surest, smoothest, sharpest cutting and most uniform files are needed.

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ened inserts in the rotary carrier and backed up by cam-actuated spring-tensioned plates.

Stock removal averages .010" to .015" and production is at the rate of 25 per minute. The studs are held within .0005" of flat, .002" for uniformity and .001" for squareness with the stem.

Fig. 4 shows the production of hardened steel ball cups which are ground on this rotary carrier at the rate of 20 to 25 per minute. Each piece is held in a cam-actuated 3-jaw chuck. Stock removal runs from .010" to .015" and the cups are ground within .0005" of flat, .001" for parallelism and .004" for uniformity.

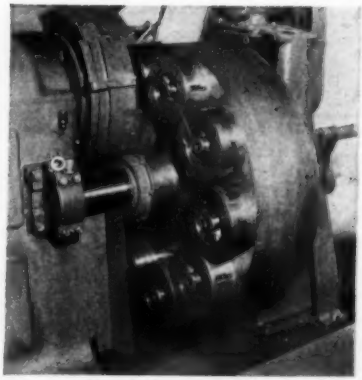


Fig. 4—Ball cups are ground at right end of machine shown in Fig. 2.

An unusual job that illustrates the versatility of double-disc grinding is shown in Fig. 5. Clutch spring discs measuring 9⅜" o.d., by ⅛" thick, made of high carbon spring steel, are ground at the rate of 70 to 80 per hour. They are held within .001" for parallelism and within .003" for uniformity. Stock removal averages .006" to .008" overall.

As will be observed, the clutch spring discs are carried between the 26" di-

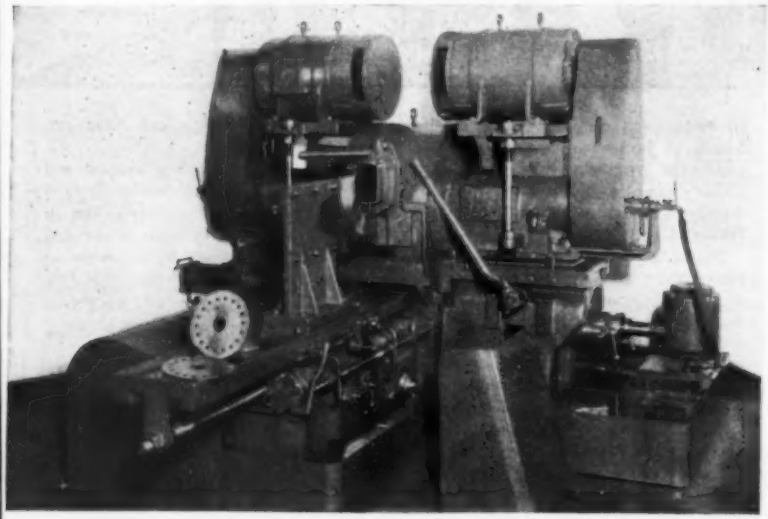
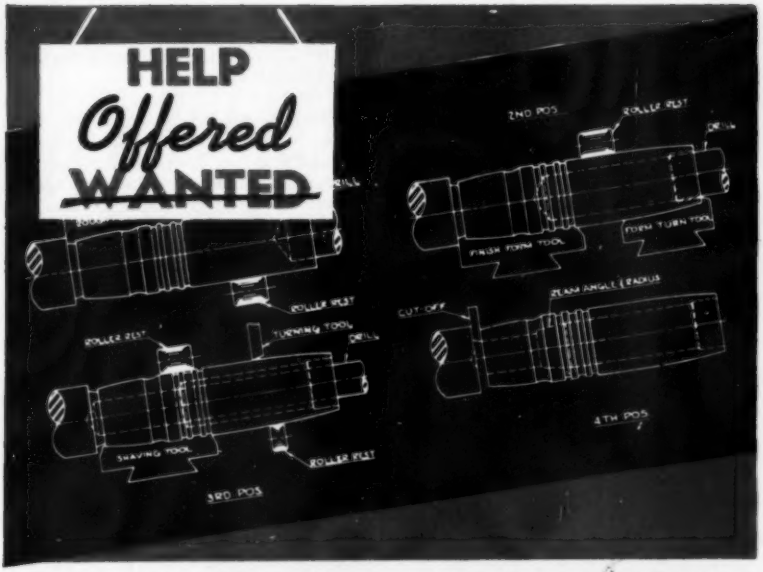


Fig. 5—Grinding clutch spring discs on a No. 120-A—26" machine.




# On SCREW MACHINE TOOLING PROBLEMS

For a number of years, Modern Collet has offered assistance to manufacturers faced with special problems in screw machine tooling. In some instances, a few simple recommendations provided the answers. In other cases, the entire responsibility for engineering the most unusual set-ups has been "thrown in our lap", and practical solutions have always been worked out.

It only stands to reason that Modern Collet is in the best possible position to offer intelligent cooperation when these problems come up. Here is a company that manufactures parts and tools for every type of screw machine. Every day, various models of machines of all makes are being modernized and completely rebuilt in the Rebuilding Department. Many of the rebuilt machines are also completely tooled for the specific purpose for which they are to be used in the customer's plant.

Because of the unique nature of our business, Modern Collet engineers and production men must be screw machine "specialists"—and that specialization covers every type of screw machine in use today. Their experience and ability can be valuable to you. Think of them *first* whenever you encounter any unusually difficult problem in screw machine tooling.

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ameter abrasive wheels in a blade type fixture mounted on an hydraulically-operated knee. The knee oscillates automatically, thus permitting several passes or cuts while the grinding heads are hydraulically closed in upon the work. The pieces are held loosely enough to permit spinning during the grinding operation, which aids materially in obtaining the close accuracies required. It is a wet-grinding job.

to .006" overall. The machine is semi-automatic in operation, employing a rotary work carrier fed from a horizontal trough feeder.

Fig. 7 shows an unusual job on a large, heavy duty 30" double spindle unit, carrying an hydraulically-operated knee upon which is mounted a special fixture for large coil springs. The machine is, of course, adapted to other

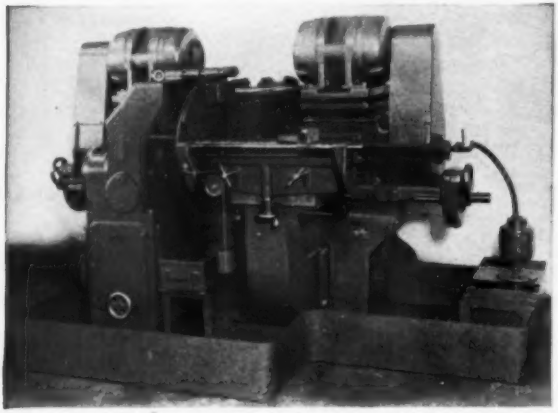

Fig. 6 — Grinding seal rings to within .0003" of parallel on a No. 125—23" double spindle machine.

In passing, it might be mentioned that two years ago, the grinding of these clutch spring discs presenting approximately 70 square inches of area to each cutting member, and in a part only 1/8" thick, would have been rejected as an impossible disc grinding job. A modern heavy duty machine with improved abrasives and an ample supply of coolant are the main factors contributing to success on this unusual job.

Another interesting job is shown in Fig. 6, involving the production of roller bearing seal rings on a No. 125—23" double spindle machine. The rings are turned out at the rate of 20 to 25 per minute within tolerances of .0002" to .0003" for parallelism and .0005" for uniformity. Stock removal averages .004"

large parallel-surface work, and the production data on these springs afford an illuminating indication of its capacity.

The fixture is of the indexing type, permitting the operator to load one end while the other presents its spring to the grinding wheels. Each spring is centered in the fixture by a hand-operated locating device, and is also clamped by hand. Travel of the grinding heads is accomplished hydraulically. Two 25 h.p. motors drive the main spindles.

On springs 12" o.d., by 1 1/8" wire, up to 22" long, production averages 20 to 25 per hour. The springs may be ground to plus or minus 1/32" for length and

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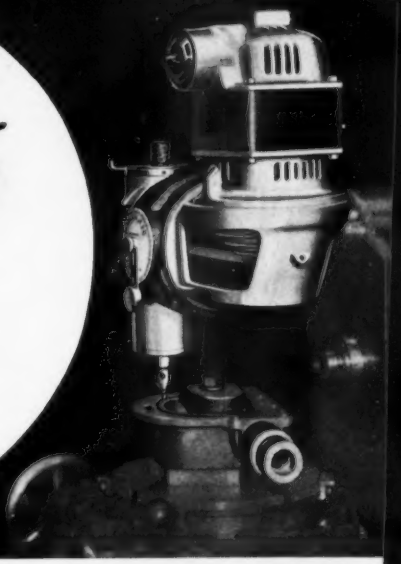

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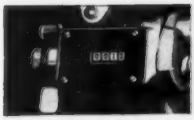

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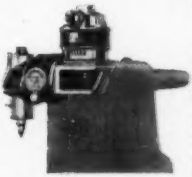

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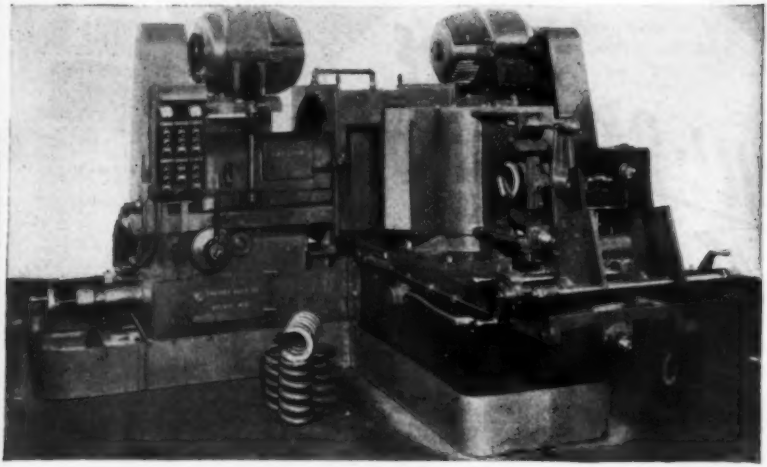

Fig. 7—Grinding large coil springs on a heavy duty 30" double spindle unit.

within 1/16" per foot of length for squareness.

Grinding the sides of tapered bearing cones is the operation shown in Fig. 8, and this reveals the adaptability of modern double spindle grinders to really exacting work. The machine is a massive 30" tool with 5⅞" spindles, weighing some 15,000 pounds and equipped with a special rubber roll feed

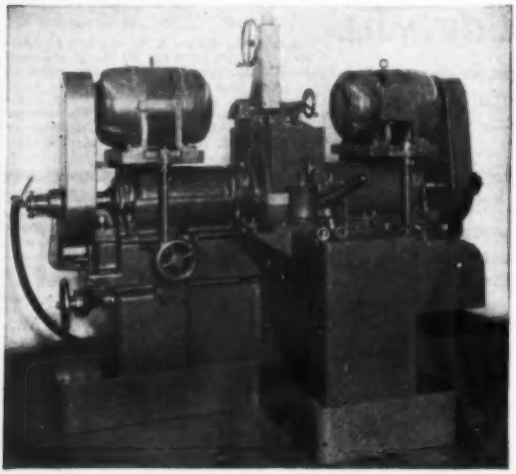

Fig. 8—Grinding sides of tapered bearing cones on a double spindle unit.

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Increase the productive capacity of your plant by freeing your grinding machines, drill presses, lathes and other machine tools of work that can be done on readily available smaller equipment. Two such pieces of equipment are shown below. They will relieve your machine tools of a wide variety of operations.

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These FLEXARMS are made in a range of sizes. Slide the coupling into the spindle of a spare motor, tighten the set screw, and you have a portable tool, good for die-sinking, grinding, drilling, boring, reaming, lapping, buffing, polishing, rotary filing and numerous other jobs. CATALOG TC gives full details and prices. Copy mailed on request.

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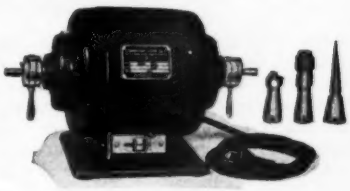

There's plenty of work in any shop for one or more of these exceptionally high quality, sturdy, powerful Bench Lathes. The chucks supplied with each one will hold abrasive wheels, buffs, brush wheels, drills and many other tools. The FLEXARMS described at the left can also be used on these lathes. Full details and prices in CATALOG TC. Copy mailed on request.

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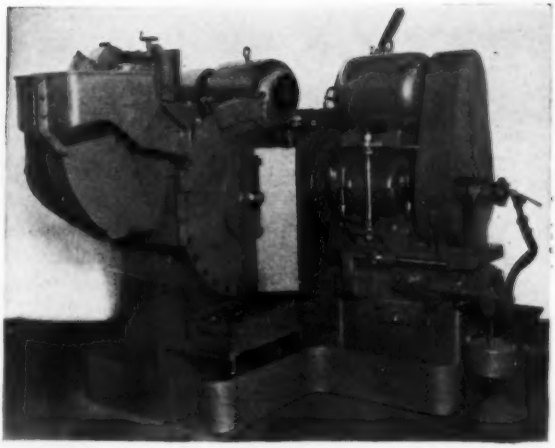

Fig. 9— Valve seat inserts are ground at the rate of 40 to 50 per minute on this No. 84 — 30" double spindle machine.

fixture. The tapered bearing cones are supported during the grinding on two steel guide bars which extend clear through the machine. The feeder sends the bearing cones through between the opposing grinding members in a constant stream, and they drop out at the rear.

When grinding cones measuring approximately 3" in diameter, removing .010" stock overall, production is at the rate of 60 to 75 per minute. Tolerances maintained are .0003" to .0005" for parallelism and .004" for uniformity.

Precision grinding of valve seat inserts at the rate of 40 to 50 per minute is the job illustrated in Fig. 9, employing a No. 84—30" unit. The inserts are made of a special alloy of peculiarly tough structure, adding to the grinding difficulties. They are fed from the large hopper at the left of the machine, into

Fig. 10 — Head and stem ends of automotive valves are rough-ground simultaneously on this special 7-head grinder.

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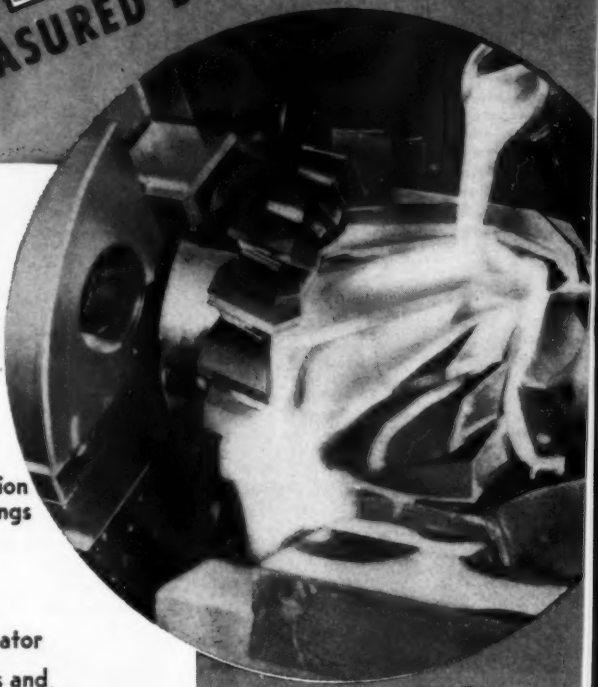

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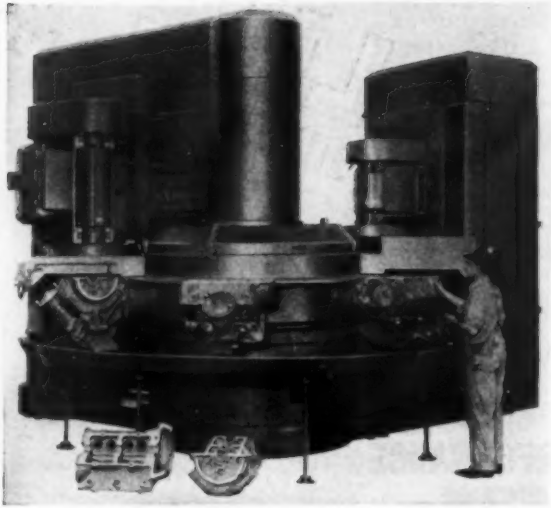
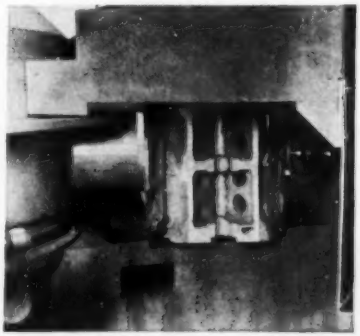


Fig. 11—V-8 cylinder blocks are snagged on this massive special purpose machine, at the rate of 5 complete blocks per minute. The smaller illustrations on this page (Figures 12-13) show the automatic indexing, 90° for end grind.

a rotary work carrier by means of an automatic plunger, and are discharged by a simple kick-out. The machine is especially massive, with 6" diameter spindles, and proportionately large dimensions throughout. It is provided with a complete wet grinding system. The inserts are ground at the rate of 40 to 50 per minute, removing .015" overall stock, and are held within .0005" for parallelism, and .002" for uniformity.

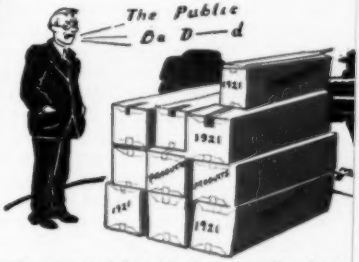
A unique 7-head unit for rough grinding both ends of valves simultaneously at one setting, is shown in Fig. 10. The machine carries 7 grinding heads, 4 of which grind the head end, and 3, the stem end as the valves pass by in a huge rotary carrier. This carrier is provided with some 30 automatic clamping and unclamping stations. The multiplicity of heads is employed because of the heavy stock re-



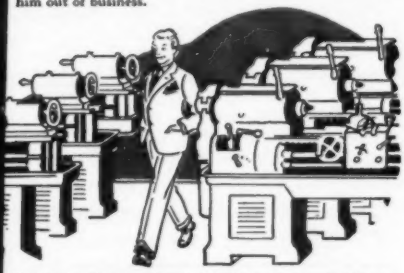
# The Vanishing AMERICAN

**1** Rapidly disappearing from the American scen the older day manufacturer who refused to cha his mind, his plant, or his product.

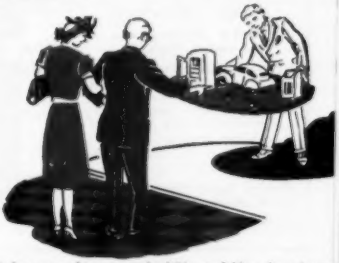
He thought machines should be run until they could run no longer. Never dreaming, of course, that slower production rates, and greater scrap losses were slowly putting him out of business.




**3** "They're crazy," he said, when competitors kept t equipment up to date and spent big sums improving t product. "The public will buy my product as it al has and like it."



Vanished and vanquished. In his place, in a new building, with modern machinery, is the new day executive. His sales are booming, and there's a comfortable, well earned profit in everything he sells.



**5** He has won the approval of Mr. and Mrs. American sumer because he offers better products, better desi at lower prices. The key to his success is no secret advice to you is . . .

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moval, and the necessity for taking light cuts, to prevent discoloration of the ground surface and to assure a fine finish. The job is handled wet, and valves are loaded and unloaded automatically.

A production of 35 to 40 valves per minute is attained, removing 1/16" stock overall, and holding within .002" for uniformity and squareness.

Snagging of V-8 cylinder blocks on a 34-ton special-purpose grinder shown in Fig. 11 is quite different from the precision operations we have been considering. This is purely a rough snagging grinder, weighing almost 35-tons, and measuring 18 feet long, 15½ feet wide and 12 feet high. It carries four grinding wheels, two on the left hand column, mounted in line, for snagging the bottom surfaces of V-8 cylinder blocks. Two are provided on the right hand column, one above the other, for snagging both ends of these blocks simultaneously. A huge rotary carrier with six work stations, each carrying a quick clamping fixture, is employed.

After a block, bottom surface up, is carried beneath the first two wheels, (one taking a heavy roughing cut, and the other a lighter finishing cut) it is automatically indexed 90° for the end grind as shown in Figures 12 and 13. Following this operation, it is automatically reindexed to its original position and manually unloaded.

Fins from ¼" to ¾" high are snagged with this machine, and in addition, a 15 to 20% cleanup of the faces involved, is produced.

Production attained is five complete blocks per minute, using three operators.

The very heart of a disc grinder is the abrasive wheel, and much of the success in all these operations depends upon the use of suitable wheels. The manufacturer of these machines also makes abrasive wheels from 1" to 3" thick, and in an almost endless variety of grains, grades and bonds for jobs of all kinds. There are wheels for all kinds of dry grinding jobs; resinoid-bonded wheels of many types for wet grinding, or for operation at higher speeds; deep-corrugated wheels for cool cutting on large areas; narrow-faced and wide-faced wheels, etc. A comprehensive engineering service is always available to help solve users' problems.

(Photos—Courtesy Gardner Machine Co., Beloit, Wis.)


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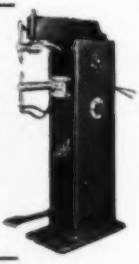

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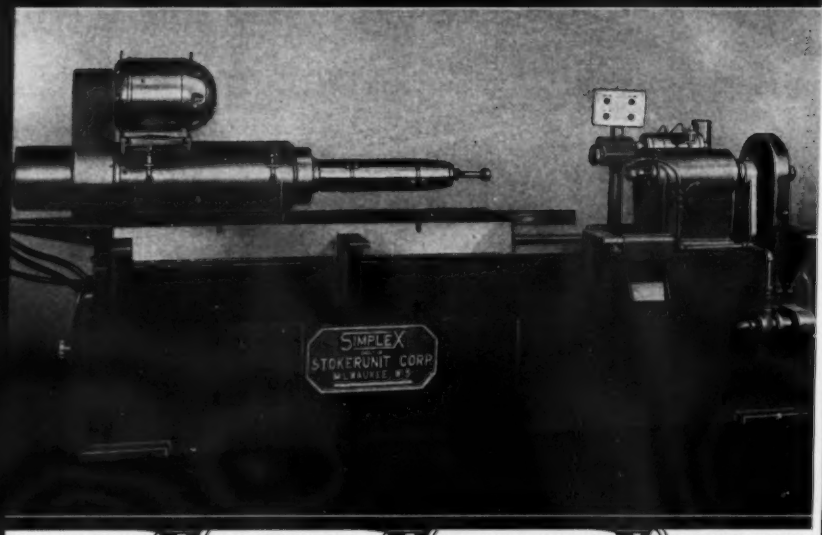


Simplex Shell Centering Machines fit directly into the conveyor line that brings the forged shell bodies up to the lathes. The operator rolls the shell on to the work tray, presses the automatic cycle start button, and 30 to 40 sec. later rolls the shell back on to the conveyor. That's all.

NOTE: The operation is fully automatic; there is no lifting of the shell bodies; production speeds are much faster than with any machines hitherto used, the heavier the shell the greater the advantage. Shells of 155mm. or 6" (130-160 lbs. weight) and down are easily handled by unskilled help with very short instruction.

Simplex Shell Centering Machines are now available for 90, 105, and 155mm. shells.

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# Rifling Cannons With Spiral Broaching Tools

By F. J. LAPOINTE

LAST January, broaching equipment comprising machines and tools for rifling cannons up to 105 mm., was placed on the market by American Broach & Machine Co.

These machines were designed for producing the rifling channels by means of cutters that cut all grooves at one time. Each cutter was followed by one of slightly greater diameter and a number of cutters were passed through the cannon. When the last full size cutters, which represented the full depth of the channels, had completed their cut, the cannon was finished as far as rifling was concerned.

These machines were capable of producing both constant and accelerated lead spirals, and the process resulted in quite a time saving over the older method, where single rifling tools were used, or where only a given number of the channels were broached at a time.

In February, developments were made

1—Rifling machine ready to receive small end of cannon barrel in bushing in face plate of machine, and breech end in quick clamping rest. The 5 broaches are carried on soft metal brackets on carrier which travels with the pull head. Bottom broach is for first operation.

2 — Cannon barrel is mounted in place and lubricating tube locked in position ready for start of cutting stroke.

by this Company and tests carried on for broaching smaller cannons, particularly on the 20 mm. cannons by use of solid spiral broaches. These tests were completed and a number of cannons broached. After some had been tested on the firing range, these were shipped at once to Great Britain.

Immediately upon completion of the tests, machines were built and put into production. A description of this equipment is here given, but before going into detail, it should be pointed out that rifling cannons by means of long spiral broaches is not new. To my knowledge, the first time this was done on long rifling sections was in the latter part of 1917, when two (2) broaches were used on a Screw Type Broaching Machine, on one-pounder cannons having a bore of approximately 1-7/16" diameter with twelve (12) spiral grooves being broached. This was fully described in the trade papers in June, 1918. The description also mentioned the fact that the broaches had oil channels and had an oil tube over the end of the broach which served as a seal so

3—View after completion of cutting stroke. No. 1 broach is ready to be removed by operator and placed on broach carrier.

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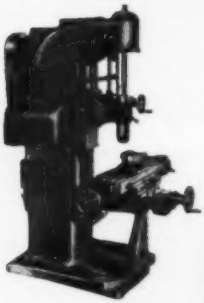

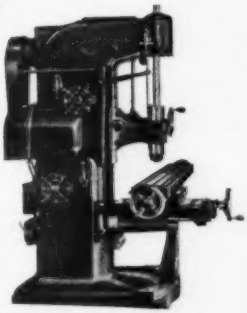

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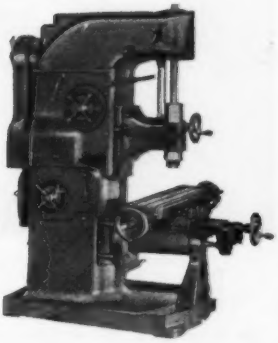
Knight Millers, because of their many features, have a definite advantage for many milling and boring operations. These millers incorporate versatility, rigidity, accuracy, speed and power. They are flexible, have a range of speeds and feeds for the efficient use of small tools and cutters as well as large. The swivel and tilting table features eliminate the need for many special angle plates, angle cutters, and costly fixtures.

Comparative relationships of the three machines may be determined from the illustrations above.



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that the oil could be forced under pressure while the broach was under the cutting action.

However, the new developments recently made by the American Broach & Machine Co., of course, incorporated advanced engineering machine design and tool design and the cannon in question, having a 20 m/m bore is approximately 70" in overall length with a broached spline section of approximately 60". The time required for broaching this, floor to floor, is approximately ten (10) minutes, depending to a considerable extent on the activity of the operator.

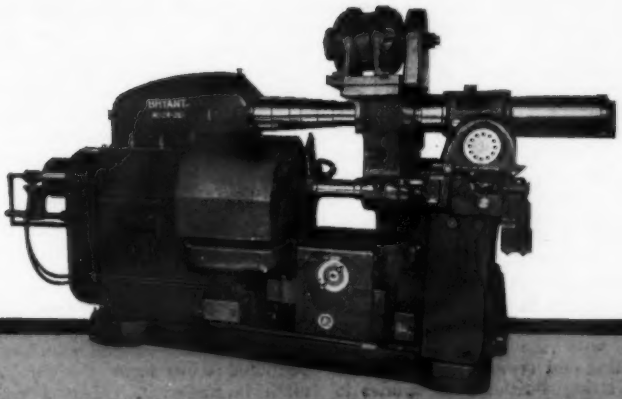
grinding equipment or special observation equipment for examining the tools. With this in mind, the broaches were designed on the most practical lines that experience dictated, viz:

The tools consist of four (4) broaches in a set. The first broach cuts one-quarter of the width of the groove to be broached, broaching all the grooves at one time, and cuts to practically the full diameter, minus a few tenths of a thousandth. This first broach, as well as all of the broaches, have three (3) oil channels for the entire length, there being nine (9) splines in these broaches. Six (6) of the spaces between splines

4—Close-up of broach rack, face plate of broaching machine and spiraling bar. The latter is used to give a positive drive to the No. 1 broach. Broaches following No. 1 have spline pilots which act as a positive drive, assisted by master spiraling bar through friction on the 4 jaws in pulling head.

In developing this equipment, the experience of this firm convinced us that the success of this operation depended upon using broaches of a simple design. They should be serviced with the least possible expense and with equipment available on the market without resorting to specially designed

are used for body for guiding the broach within the bore. The other three (3) spaces, i.e., every third space, has an oil channel ground in it between the cutting splines which serves as a passage for the oil so that lubricating oil may be forced through this passage rapidly under pressure.



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The second broach cuts the same amount of stock, but the width of the splines is twice as wide as No. 1. This allows the second broach to cut a ribbon off each side of the previously cut groove. The previously broached groove in the cannon serves as an added oil passage for the lubricating oil which is fed under pressure in the direction in which the broach travels.

The third broach cuts an additional one-quarter of the width, or three-quarters of the final width of the groove, and performs the same as the first and second broaches.

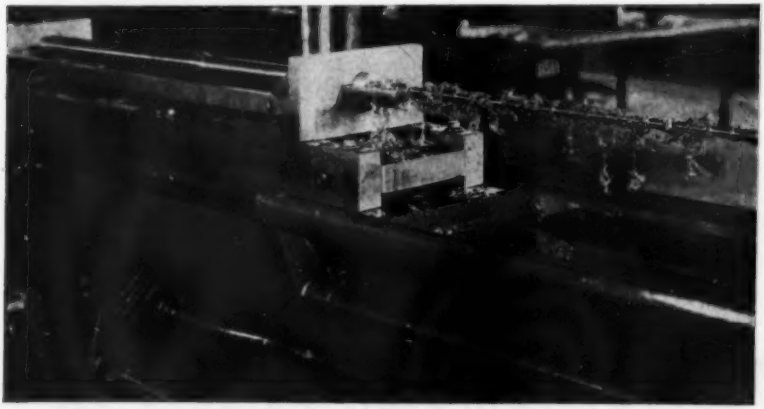
The fourth broach follows the same principle with the exception that at the finishing end several teeth are used for final sizing, finishing the splines to their full depth.

The broaches used are approximately 48" long and can be serviced by ordinary broach grinding equipment without need of any specially designed machinery, and can be ground by anyone familiar with broach grinding.

All broaches have a short pilot at the starting end. The first broach has a plain round pilot and the No. 2, 3 and 4 broaches have spline pilots to locate them in their proper positions to follow the previously broached hole.

Just ahead of pilot is provided a thread of the opposite lead to the spiral cut. This thread is used for attaching a pulling shank. The purpose of the detachable shank is to keep the length of the broach down to normal. They can be placed on centers and ground like any conventional broach. Also, the shank portion can be used on indefinitely.

Tooth design of the broaches is different from the conventional types of broach design. In the standard conventional tooth form, the face of the tooth is undercut. Then a width of tooth land is provided, followed with a tapered portion or spool effect. It has been found that on such work this type of tooth is not the best design—that the taper or bevel portion back of the land should be cut straight to the bottom of the chip pocket. The purpose of this is to provide a shoulder for the chips to float against when the oil



5—View of broach just after having been pulled through a cannon. It will be noticed that the chips are very open and tend to divorce themselves from the tool.

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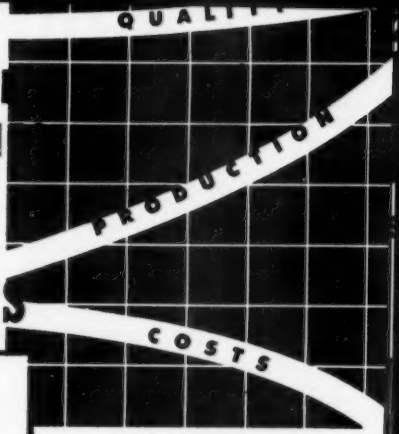


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is forced into the cannon during the cutting period of the tool. With the tooth having the tapered or beveled back section, which is the conventional design, this would be bad, because there would be a tendency for chips to float up on this angle and wedge between tool and work, no doubt causing considerable scratching of the bore and the broached rifled grooves of the cannon.

In designing these broaches, the threaded portion for pulling has been made smaller in diameter than any other part of the broach. This is purposely done to weaken that part. It serves as a safety protection so that in the event of an accident, the thread is always broken, in which case the pilot is of sufficient length so the broaches can be re-threaded. To date, after several months of performance, there has been no occasion to break any broach, due to pulling load.

The design of the broach is such that each tooth is permitted to take a cut sufficient to prevent scraping, or a tendency to want to ride the stock and then periodically dig in. This is one reason why each broach is designed to cut to practically the full depth, in order to make each tooth remove its proper recognized amount of material. This feature also makes it simpler to grind the broaches in service and no special inspection equipment is necessary, as there is sufficient difference between teeth to be easily measured and checked properly.

Figure 5 shows a broach just having been pulled thru a cannon, and it will be noted that the chips are very open and act very freely to divorce themselves from the tool. This is caused by two things. One is the proper stepping of the tooth and the high turbulence of oil being forced the entire length of the broaching tool during its cutting operation. Actually, the chips, when placed in the hand are soft and can be broken very easily by rolling

6—The first few teeth of broach after passing through cannon. Note flow of oil to the left of the chips.

them in the hand, showing that the chip cut, which is in the form of a narrow ribbon, is of a proper thickness and places itself in a very small chip area. When handled, it resembles steel wool.

Fig. 6 shows the first few teeth of the broach just as it has passed through the cannon. It also shows the flow of oil just to the left of the chips. A stream of oil passes through the entire length of the cannon while the broach is on its cutting stroke.

Fig. 7 shows an end view of a section of the cannon; also a longitudinal view showing spline grooves. Fig. 8 shows a sectional view of the 105 m/m cannon for comparison.

The machine developed for broaching these small cannons is a Pull Type Machine, and needless to say, it is hydraulically operated. While it has recently been suggested in some quarters that hydraulically operated machines are not satisfactory for rifle broaching

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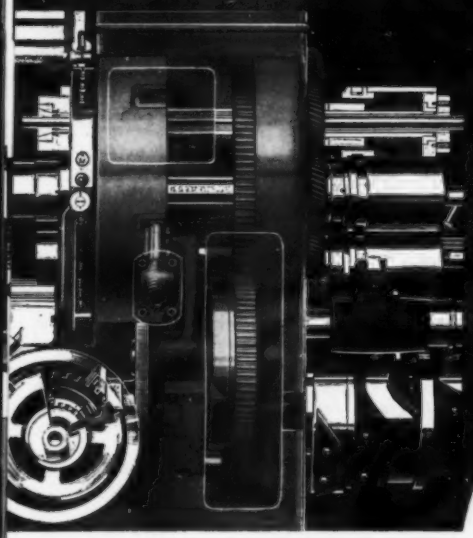

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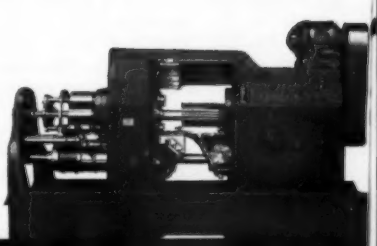

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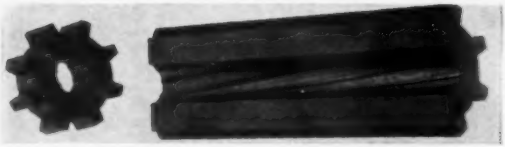


7—End view of a section of the cannon; also a longitudinal section showing the spline grooves.

operations, I differ on this point. It would certainly be retrogressing to admit that hydraulics, as used on machine tools today, is unsatisfactory and that the machine for doing this work would have to be a mechanically operated machine. Hydraulics as now used has been proven on machine tools and there is no reason to consider any other type of drive for rifling by the broaching method.

My first experience in spiral broaching dates back to 1903. Present methods are not very much different except for the refinements, such as steels, the limits to which the tools are made, and the admittedly superior performance of machines, due to hydraulic feeds and closer tolerances that are used in the manufacture of the equipment.

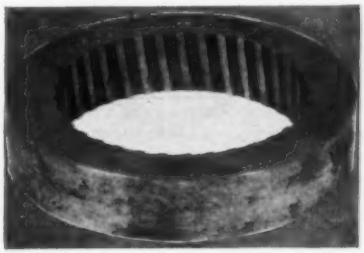
Fig. 1 shows the American Hydraulic Pull Broach Rifling Machine. It will be noted that the machine carries the broaches in a carrier which travels with the pull head. This view shows five (5) broaches that are laid in soft metal brackets, the first operation broach being the bottom one, the second above that and so on. The top broach, which is very short, is a master sizing broach and is only used when it is detected that broach No. 4 is showing signs of dullness. At that time No. 5 is pulled through as a master sizer. The No. 4 broach is then resharpened or replaced with a sharp broach. The reason for having master broach No. 5 is to prevent loss of the cannon, due to a quick discovery that the No. 4 broach shows signs of needing resharpening.

Fig. 1 shows the machine ready to receive small end of the cannon barrel in a bushing in face plate of the machine, and the breech end in the quick clamping rest, which centers cannon ready for the broaching operation. The first broach is inserted into the cannon and the oil tube shown at the left is slid into place and locked.

Fig. 2 shows cannon mounted in place and the lubricating tube locked in position ready for machine to be started on its cutting stroke.

Fig. 3 shows machine after completion of cutting stroke. The No. 1 broach is ready to be removed by operator and placed in position on broach carrier.

Fig. 4 shows a close-up of broach rack, face plate of the broaching machine and the spiraling bar. It will be noted that a spiraling bar is used to give a positive drive to the No. 1 broach. The No. 1 broach has a flat provided on the pull shank so that it is driven positively by means of a four-jaw pull head provided with a positive drive. All broaches following the No. 1 broach have spline pilots which act as a positive drive, assisted by the master spiraling bar through friction on the four jaws in the pulling head. The machine is built in two sections.



8—Sectional view of a 105 m/m cannon shown for comparison.

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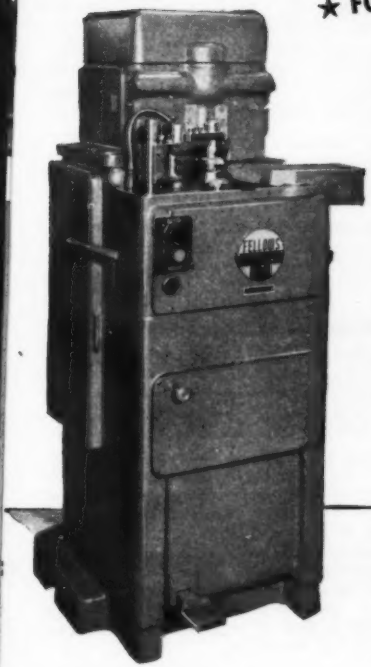

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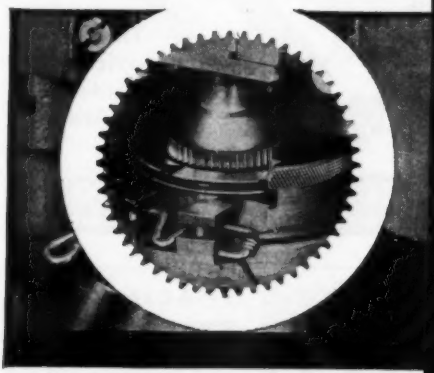

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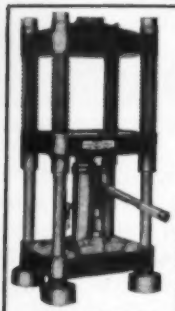

*Above illustration shows a bench type press 12 by 18 size*

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The right hand portion is the machine and contains the hydraulic equipment, pulling head, hydraulic oil reservoir, pressure gauges, spiraling bar and electric motor. The left hand portion contains the work fixture, lubricating pump and motor and lubricating oil reservoir. The machine is so designed that at any future date, the right hand portion, or the machine proper, can be used as a normal broaching machine for commercial broaching of all shapes of holes, including splines, straight and spiral, in such work as comes within its pulling capacity, and provides a broaching unit of an exceptionally long stroke for commercial broaching.

The machine is provided with variable speed control for the cutting stroke, and on the operation of broaching 20 m/m cannons, it has been found that a cutting stroke of about 8 feet per minute proves very satisfactory.

(Illustrations — Courtesy, American Broach & Machine Co., Ann Arbor, Mich.)

## Speedloy Bits and Tipped Tools

A new bulletin issued by Circle Tip Tool Co., East Orange, N. J., gives details and specifications on the available sizes and types of Speedloy (cast tungsten alloy) tool bits and tipped tools.

These tools are said to be especially good for stainless steel and chrome nickel alloy steels. They are claimed to fill the gap between high speed steels and the tungsten carbides in performance and price. Wear resisting qualities are said to excel those of high speed steel with greater toughness and shock resistance than the carbides. Special grinding wheels are not required for Speedloy.

These tools are recommended for boring, turning and facing of steel, malleable iron, cast iron and non-ferrous metals. High hardness at high temperatures and resistance to shock and abrasion are advantageous in heavy or interrupted cuts. Speedloy is also suitable for parts subject to corrosion or excessive wear such as gages, centerless grinder rests, etc.

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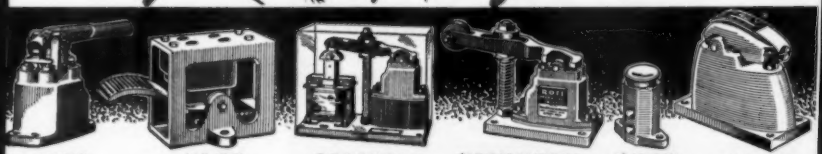

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# Shell Centering in the Conveyor Line

By FRANK PALMER

THE centering of forged shell bodies for machining operations should be a simple job, easily and quickly handled. However, much time and labor can be wasted in this initial step if it has not been properly organized in an efficient manner.

For shells of from 75 to 105mm., caliber, an automatic shell centering machine in the conveyor line can save a surprising amount of time and cost over centering methods which require the shell bodies to be picked up, accurately placed and centered by a trained machinist, and then replaced on a truck. When the shell bodies are of 155mm. or 6" and up, consequently weighing 130 lbs. and up, the shell centering machine in the conveyor line is practically a necessity unless there is to be a serious bottleneck right at the start of the machining on the shells.

The Simplex Shell Centering Machine (Fig. 1) has been very recently developed by Stokerunit Corp., Milwaukee, Wis., specifically for centering shells of 90, 105, and 155mm. in minimum time, without any lifting, and requiring only unskilled help. This new type machine is installed right in the conveyor line which runs over brackets on the near side of the machine.

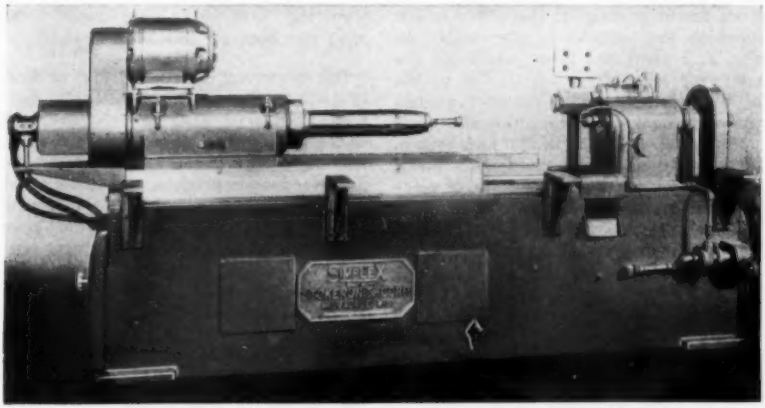


Fig. 1—Simplex Shell Centering Machine for 90-105-155mm., shells.

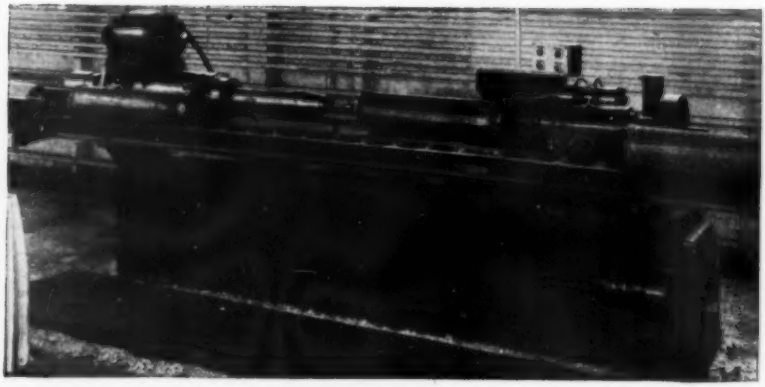

Fig. 2—155mm., shell bodies from forge shop are pushed along a spool type roller conveyor to centering machine and easily rolled over onto the work tray of the machine for centering. The centered shells are rolled back on the conveyor and pushed along to the lathes for machining.

An idea of the extreme ease with which even heavy 155mm., shell bodies (weight 130-160 lbs.) are handled in the centering operation can be obtained from Fig. 2. Here the Simplex Machine is placed near the beginning of the spool type roller conveyor along which the shell bodies are pushed from the receiving platform, where they come in from the forge shop, to the lathes which machine the outsides of the shells. In Fig. 2, a shell has been rolled off the conveyor on to the work tray or platen of the machine. The operator pushes the start button for the automatic cycle and can then stand aside and watch. This sequence of operations takes place, actuated by a complete system of electric and hydraulic controls:

The table, to which spindle head is bolted, advances rapidly pushing mandrel into the open end of the shell. When the inside locating button at head of mandrel strikes the end of the shell cavity, the platen drops, leaving the shell supported on the mandrel. The table advances from here on at a slower rate to push the base (closed end) of the shell up against a spring-loaded locating button. The forcing back of this stop actuates a limit switch which causes:—(1) The hydraulic system to cut in and expand the jaws of the mandrel for holding the shell firmly in position and the table comes to a stop; (2) The stop button retracts free of the shell; (3) The mandrel and shell start revolving; (4) The centering head starts revolving and advancing rapidly to meet the boss on base of the shell.

The centering drill feeds fast at first (Fig. 3) as it cuts into the shell, then speed and feed progressively decrease as the size of the tapered hole increases. An adjustable limit switch stops the drill feed at a predetermined depth of cut. A dwell period follows during which the drill cleans out the hole. The drill (centering tool) is then rapidly retracted. Hydraulic pressure in the mandrel is released to free the shell, the table returns, retracting the mandrel from the shell against a stripper plate, and the automatic cycle ends with return of the work tray and the spring-loaded stop to position. The operator rolls the centered shell onto

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This force which we call "*The Phantom Gear*" has been the inner urge of Monarch for more than 30 years. It stimulated our many pioneering improvements which have so broadened the scope of lathe work. Its power will continue as long as there's a Monarch—helping the thousands of owners and operators of Monarch lathes produce more goods for more people, at lower cost—and in emergencies, working for the defense of our Nation. The Monarch Machine Tool Company, Sidney, Ohio.

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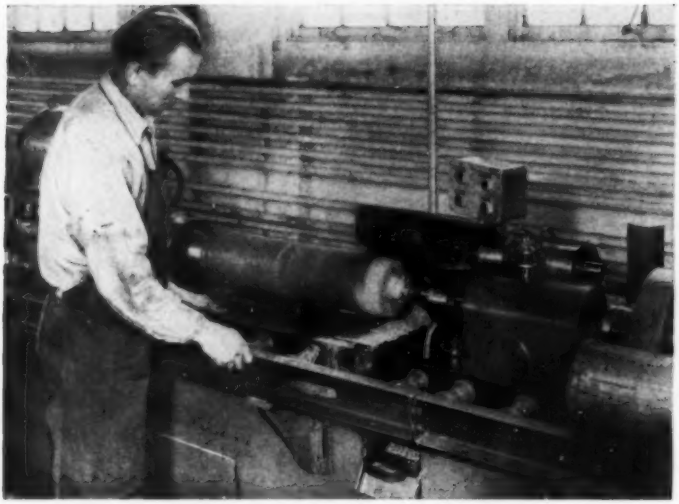

Fig. 3 The centering operation is part of a fully automatic cycle, started when shell is in position on the work tray, and ending when it is ready to be rolled back on the conveyor. The operator is just an onlooker during the centering.

the conveyor and moves the next shell into position.

Ordinarily, shells can be centered and returned to the conveyor in 30 seconds. Allowing, however, for runs of shells requiring deep centering, a production of 100 155mm., size an hour can be maintained at 85% efficiency. The ordinary duties of the operator are confined to rolling the shell body from conveyor to work tray of the machine, easily done with the heaviest shells for which the machine is built, pushing the start button for the automatic cycle, and rolling the shell back onto the conveyor. Hydraulic pressure is applied by a control button at the beginning of work and stays on till operator presses the stop button when leaving the machine. The only mishap that may occur is breakage of the centering drill in the shell. When this happens,

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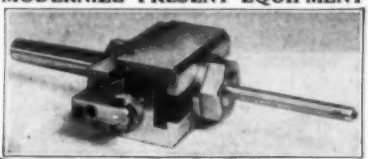

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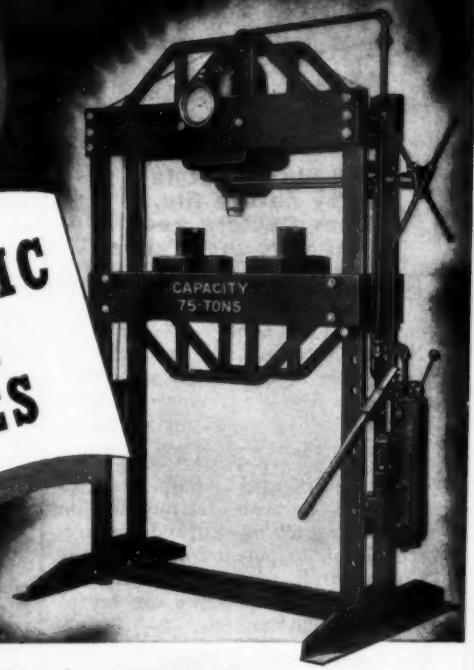


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# Tool Making Holds Many Interests Not Fully Known !

**As all files by style**
**And by nature file,**
**All our Cutters gear**
**To the cuts they "shear".**

Their design and make grade their "Ground-tooth's" rake; and their increased speed helps results to lead. Now the very best, that is known by test, brings a smile to costs by "deburring" loss. Severance restarts, where the old departs, for "Regrinding" rears what was scrapped for years.

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**To users of Rotary Files:**

***"There is no shortage in the Midget Milling Cutter Field of standard shapes and sizes".***

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MANUFACTURERS of Midget Milling Cutters, "Ground from the Solid after Hardening"—"Chatterless" Countersinks—Tube Deburring Cutters—and Special Tools. Also, "Regrinding Service" which enables the average Midget Milling Cutter to do the work of ten ordinary Rotary Files. Users and Prospects on the Pacific Coast may address our Western Branch at 3844 South Santa Fe Avenue, Los Angeles, California.

**REGRINDING CONSERVES STEEL**


the operator, by pushing the emergency stop button immediately starts retraction of the centering head. The sequence goes on from there to the release of the shell.

It will be evident from this description that unskilled help can be taught to perform the few simple manual operations involved in a very short time. Nor is there any lifting or other heavy work. The special features of construction of the machine may be summarized briefly here:—

The left end of the machine carries the table, sliding on hardened and ground ways, which carries a substantial work head with driving motor and spindle. The spindle has an extension mandrel fitted with two sets of expanding jaws and at the end, the inside locating button which is adjustable for different lengths of shell bodies or thicknesses of base ends. The right end has the spring-loaded locating mechanism and the centering head operated by its motor drive. The electric control panel (Square D) and the Sundstrand hydraulic equipment are in cabinets mounted on rear of the bed. A control station above the right end carries start and stop buttons for the hydraulical pressure, and start and emergency stop buttons for the automatic cycle. A coolant pump operates automatically to keep coolant flowing while the centering tool is revolving.


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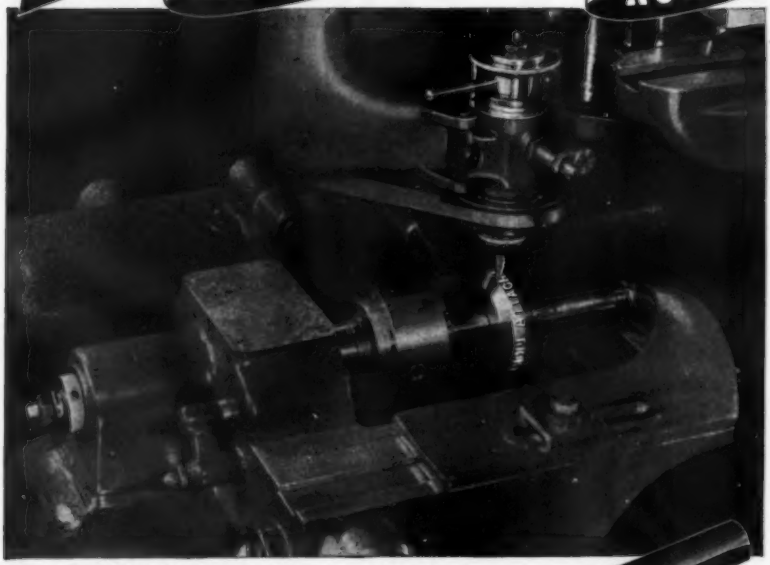

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# Magnetism in the Tool Shop

By R. B. ANNIS

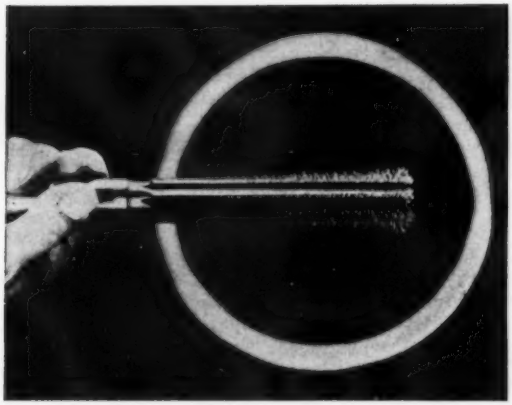
PRODUCTION in tool shops and in the metal fabricating industry is nearing an all time peak and accompanying this intense growing activity is a natural shortage of material, men and hours. Anything that will save on these three basic production items will result in increased output and speed up the defense effort.

Magnetism needs no "priority." You already have it in your shop, sometimes performing useful duties but more often as the unsuspected, invisible force that causes many annoying delays and shutdowns.

A brief review of the underlying principles regarding magnetism may assist the shop man to understand better and control this mysterious something that exists all around him.

The ancients in the province of Magnesia, Asia Minor, discovered an ore that had the peculiar property of attracting pieces of iron. This ability to attract iron was called magnetism and the name magnet was applied to any piece of ore possessing this property.

Later the discovery was made that if these magnets were suspended so they could turn freely, they would come to rest in positions pointing north or south. They were therefore called leading stones or lodestones, and were the forerunners of the modern compass.



Look out for trouble whenever tools become sufficiently magnetized to gather a halo of metal particles along the cutting edges.

This north and south directive force was due to the reaction between the magnetic field of the lodestone and the little known earth's magnetic field.

It was noticed that if a bar of hardened steel, such as a knitting needle, was rubbed with a lodestone, the steel acquired similar magnetic properties. Therefore, these steel bars might be called artificial magnets.

Abrasive metal particles gang-up and cling to magnetized cutting edges.

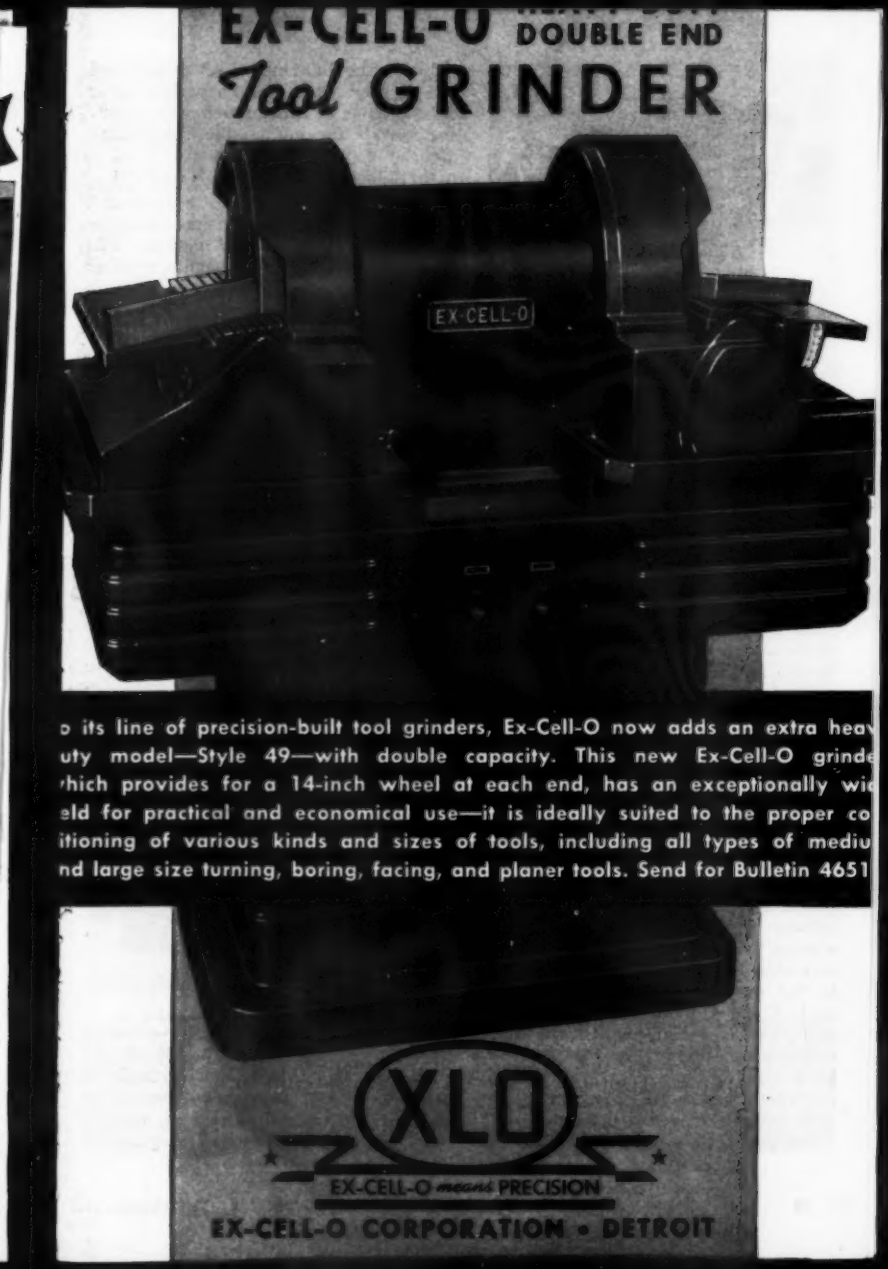
A magnetic substance is one that is forcibly attracted by a magnet, or one that is capable of being magnetized. Of the hundreds of substances surrounding us, very few are pronouncedly magnetic:—lodestone, steel, iron, nickel and cobalt are all magnetic to a greater or a lesser degree. Various alloys of these metals with one another and with some other materials also show magnetic properties. Substances such as wood, glass, fiber mica, asbestos, cloth, copper, lead, aluminum, gold, etc., are considered non-magnetic as they are not capable of becoming magnetized. Also, certain combinations of two normally magnetic substances, iron and nickel with chromium, are also non-magnetic. These special alloys are our familiar full stainless steels.

Although the above and many other substances may be considered as non-magnetic, there is no known "insulator" for magnetism. A magnetic field will penetrate and attract through wood, glass, bakelite, mica, copper, etc., the same as though these non-magnetic materials were replaced with air. Objects may be shielded from magnetic affect somewhat, by by-passing the field through an easily magnetizable, soft iron shield of sufficient thickness to offer an easier path for the disturbing magnetic field, than through the object being protected.

Whenever a piece of iron or steel is placed in a magnetic field, it also becomes magnetized, and within certain limits, the stronger the magnetic field, the stronger becomes the induced magnetism in the iron or steel.

When the magnetizing field is removed from a piece of pure soft iron that exhibited full magnetic properties while in the magnetic field, it will be discovered that the iron has lost its temporary magnetic qualities, and there is no remaining or residual magnetism. If, on the other hand, a piece of steel, an alloy of pure iron and carbon, is treated in a similar manner, it will be discovered the steel retains magnetic qualities after the magnetizing field is removed. Generally speaking, the harder the steel, the more residual magnetism.

This property of hardened steel is very useful for some purposes and various steel alloys with carbon, tungsten, chrome, nickel and cobalt are used in making efficient artificial or permanent magnets for use in electrical instruments, compasses, loud speakers, etc. These steel alloys with some additional variations are the same steels used every day in the toolroom, viz: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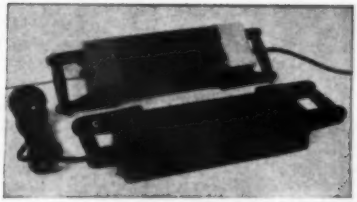


Portable surface type demagnetizers are handy for work that cannot be moved readily.

**High Carbon Steel**—Drill Rod, Drills, Taps, Hand Reamers, etc.

**Tungsten Steel** — Tool Bits, Drills, Taps, Machine Reamers, Gauges, Forming Dies, etc.

**Chrome, Nickel, Cobalt Steels, Etc.**—Embossing Dies, Intricate Punches, Mandrels, Extrusion Dies, Gauges, etc.

Practically all of the tools used and made in the toolroom today are composed of steel alloys that are strongly magnetic and retain their magnetism. In other words, they would make good permanent magnet material. These tool steel alloys, however, were developed for their various mechanical properties of hardness, toughness, wear resistance, non-warping properties, machinability, etc. and their magnetic properties are only incidental.

Magnetic fields are everywhere in the shop. First of all is the ever present earth's magnetic field which, although relatively weak, is nevertheless easily observed and produces more or less of a cumulative effect by inducing magnetism in steel sections that are subject to vibration or heating and cooling cycles when they have an appreciable length in a direction parallel to the earth's field. In the northern half of the United States, the earth's field dips considerably to the north magnetic pole, roughly 60° from the horizontal. Either vertical, or horizontal, north and south lying steels may thus become magnetized.

The punch press stands vertically and subjects the hardened steel punch and die to high frequency vibration over long periods of time; practically a perfect setup for cumulative magnetization.

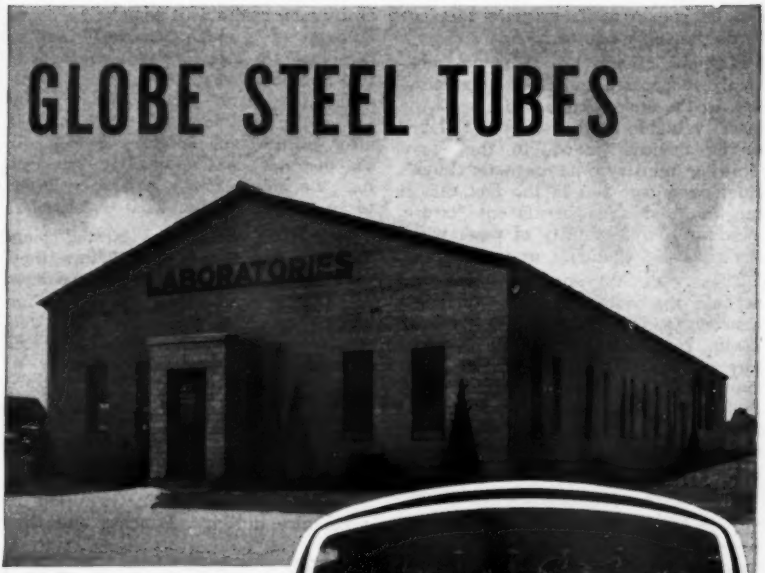
Wherever an electric current flows, the magnetic effect is also present, and the stronger the current the stronger the magnetic field. By allowing this same current to flow through a number of turns, as in a coil, the magnetic effect is stronger in proportion to the number of turns of the coil.

Large motors or other equipment drawing heavy current produce magnetic fields around themselves and their power supply lines. Steel may become magnetized when near this equipment, particularly when the supply is direct current. This same effect is also noticed on a.c. circuits that are switched on or off. Spot Welders, for instance, have a very strong magnetic field extending some distance around their heavy current secondary welding circuit.

This 10" demagnetizer provides effective operation with proper cooling and protection.

A piece of hardened steel brought in contact with a permanent magnet or another magnetized steel part, will, in turn become magnetized. This property

# GLOBE STEEL TUBES

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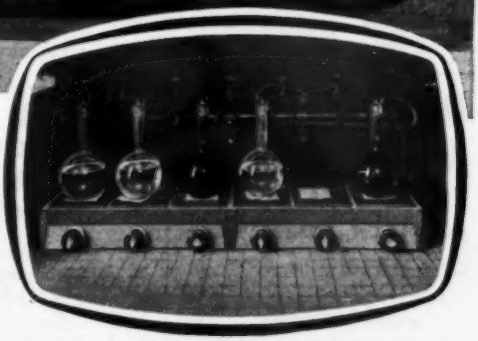
# HEVI DUTY HOT PLATES



**In their new laboratories the Globe Steel Tubes Co. have installed a Hevi Duty Six Station Electric Hot Plate for chemical analysis . . . These compact multiple stations allow for saving of space and convenience of operation.**

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can be passed on from piece to piece in decreasing amounts.

Magnetic chucks are the most commonly recognized source of magnetization in the shop. They are one of the most valuable and convenient labor saving devices known to the metal working industry. The magnetic chuck's chief advantage lies in the fact that it can be used as a permanent fixture, handling a wide variety of work without resetting, changing, or loss of time.

These magnetic chucks are designed to hold the work tightly by inducing a strong field of magnetism in the work itself. Non-magnetic materials, therefore, cannot be held on a magnetic chuck. If the work is hardened steel, the residual magnetism remaining in the steel, after the chuck is turned off, sometimes makes it difficult to remove the work from its chuck.

The effect of magnetization on the cutting action of tools is probably most easily seen in the drill press. The combination of a magnetized drill and a deep hole in iron or steel presents a real problem. A broken drill is generally the result unless the operator uses extra precautions, clearing his drill often as the hole becomes deeper. If the operator does succeed in "jockeying" the hole through, it is very likely to be rough and somewhat oversize.

Magnetized drills and cutting tools bind, heat and dull long before they should, normally. Clinging particles mean dull equipment. Look out for trouble whenever tools are magnetized sufficiently to gather a "halo" of metal particles along the cutting edges.

The scale or oxide coating found on most hot rolled steels breaks into small hard flakes during machining. These abrasive particles cling to the magnetized cutting edges, rubbing constantly between tool and work, resulting in premature dulling. Punches and Dies


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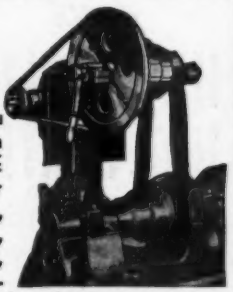

When you purchase a STEEGE Drive for your lathe, shaper, miller, etc., you're protected by our broad 5-year guarantee.
STEEGE Drives are easily installed—prices $35.00 up—sent on 30 days' approval.
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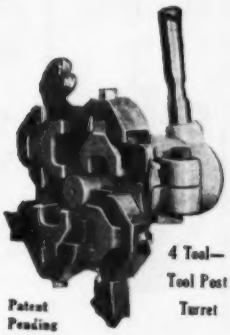
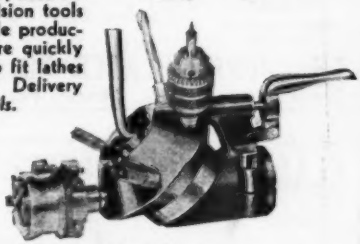
"Double Your Production Capacity" by a quick and economical method of converting your engine lathes into complete, accurate turret lathes. Simply install the Jefferson Tail Stock Turrets, the Jefferson Tool Post Turrets and the Jefferson Adjustable Pull-Feeds.

All kinds of work, including boring, finishing, knurling, drilling, tapping, roughing and forming, can be done efficiently without stopping lathe or changing tools. Jefferson Turrets are real production tools, substantial, rigid, accurate and adaptable to any size. These sturdy precision tools have in many cases made it possible to "double productive capacity"—because nine different tools are quickly available at all times. Made in several sizes to fit lathes with 20" swing down to small bench lathes. Delivery 10 days. *Let us mail bulletin for further details.*



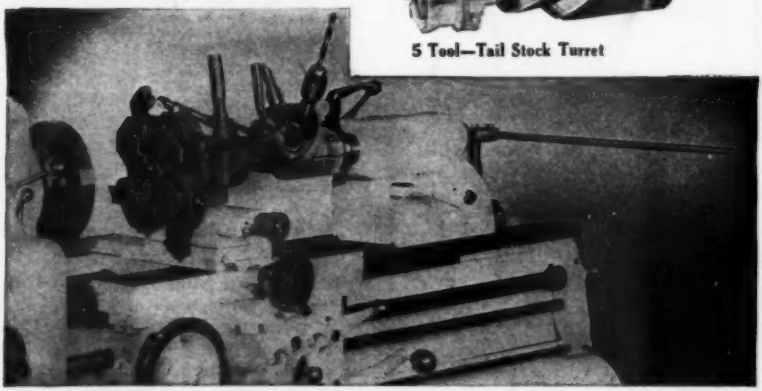
4 Tool—Tool Post Turret

Patent Pending



5 Tool—Tail Stock Turret

*We also manufacture Belt Sanders, Swing Frame Grinders, Gyratory Foundry Riddles and Milling Machines. Let us mail bulletins giving full details.*



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Here's a profitable tool room unit. Quickly makes hundreds of sizes of springs. Sturdy, dependable . . . a real time and money-saver.

Illustrated is No. 4 Universal with adjusting shaft of 5/8" square. Takes wire up to 1/4" diam.

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CLARK FACTORY TRUCKS

No. 250

SKIDS TANKS
RACKS WHEELS
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ALL STEEL WELDED TRUCK CORP.
ROCKFORD, ILL.

are subject to the same abrasive action while punching these materials. This results in shorter runs between grinds and subsequent reduced tool life.

What can we do in the practical shop to prevent some of these troubles due to magnetism? In reference to the earth's field, very little can be done in the way of a preventive with the exception of orienting the maximum dimensions of machine tools—broaches, punch presses, etc., as nearly as practicable at right angles to direction of the earth's field. Such a change is seldom warranted though unless trouble from this source is actually indicated.

Production demagnetizing using oil cooled unit equipped with adjustable pole pieces.

The wires or cables leading to large motors, furnaces, etc. should be close together and preferably inside of an iron conduit which acts more or less as a magnetic shield, preventing any stray magnetic field from affecting surrounding objects.

The magnetic fields surrounding some d.c. equipment and the secondary cur-

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DAYTON, OHIO.

AMERICA'S LEADING INDEPENDENT MOTOR MANUFACTURER

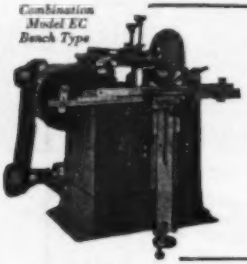
A typical large, heavy duty "through" type demagnetizer with 18" x 24" opening.

cuits of spot welders, etc., cannot be shielded easily. Therefore, the only way to avoid trouble from induced magnetism is to keep hardened tools a reasonable distance away from these local magnetic fields.

Permanent magnets or magnetized tools have no place in a tool room. They are likely to cause trouble by inducing magnetism in other tools with which they come in contact.

Most electro-magnetic chucks, i.e., chucks operated from a direct current power supply, are furnished with a releasing switch by which the electric current producing the magnetism in the chuck may be turned off or reversed. A momentary reversal of the polarity of the current flowing in the chuck helps to cancel the residual magnetism in the face plate of the chuck so that the work being held can be removed more readily. Many parts, particularly those of hardened steel, become permanently magnetized by the strong magnetic field to which they have been subjected. Such hardened steel work should be demagnetized to remove this residual magnetism. Where consistent results are wanted, all cutting tools should be free from magnetism or be in a demagnetized condition.

In the old days you probably remember taking a watch that was "acting up" to the jeweler to be demagnetized. He placed your watch in a small coil and, using either batteries or direct current from the power line, operated some sort of a crank, lever or slide type

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The WARDWELL SAV-A-SAW automatically sharpens saws with teeth as fine as 32 to the inch at a speed up to 75 per minute. Savings on 2 gross of blades will pay for the machine. Assures keener cutting saws at extremely low cost.

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**THE WARDWELL MFG. CO.**

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# Get DOUBLE DUTY out of your drill presses with Ettco-Emrick TAPPING ATTACHMENTS

**SIZES**
**FOR NO. 0 TO 1" TAPS**

## SAVE TIME

*in solving your tapping problems. Our 25 years of specialization in machine tapping are always at your service. Write us.*

### OUTSTANDING FEATURES

- SENSITIVE FRICTION CLUTCH—provides a positive drive that releases the instant tap sticks or bottoms. Long-wearing friction members are replaceable as a unit in a few minutes.
- TAP IDLES IN CUTTING DIRECTION — prevents chamfering hole; speeds up tapping; doubles tap cutting edge life.
- AUTOMATIC REVERSE
- BALL - BEARING MAIN SPINDLES
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- ALL HELICAL GEARS—quiet, efficient.
- FOOL-PROOF TAP CHUCK — has positive, visible grip.
- QUILL CLAMP — can be furnished for fastening attachments to any drill press —assures rigid mounting.

There's no need for your drill presses to be idle when they're not drilling. By simply clamping Ettco-Emrick Tapping Attachments to their spindles they become high speed, sensitive tappers. And when you want to go back to drilling, it takes only a couple of minutes to take off the attachments.

But don't get the idea that this is a "make - shift" tapping arrangement. These time-tested and proved Ettco-Emrick attachments will turn out tapped holes as **accurately** and as fast as machine tapping can be done. You'll find the reasons why in the exclusive design and construction features listed at the left.

**FULL DETAILS** about these attachments, and prices, are given in BULLETIN No. 2. Write for a copy —today.

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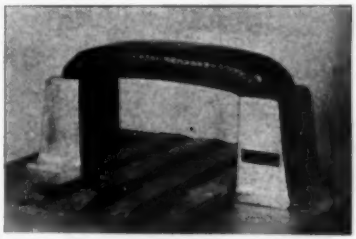
**DRILL CHUCKS • TAP HOLDING CHUCKS**
**TAPPING ATTACHMENTS • TAPPING MACHINES**
**MULTIPLE SPINDLE TAPPING AND DRILLING HEADS**
*Unexcelled for Design, Materials and Workmanship*

commutator that alternatively reversed the flow of current, thereby reversing the magnetic field surrounding the demagnetizing coil. As the magnetic field continued to reverse, its effect on the watch was gradually reduced in intensity; by introducing increasing resistance into the electric curcuit or by gradually moving the watch out of the field of the demagnetizing coil.

Now demagnetizing is easy. With the nearly universal use of alternating current as the dependable power source is most shops, demagnetizing equipment has become more simple and has grown in scope and efficiency to meet the growing need.



Flush bench top mounting 6"x12" heavy duty demagnetizer.

There are two general types of demagnetizing equipment available. First, the Surface Type Demagnetizer. These demagnetizers operate on alternating current frequencies from 25 to 60 cycles and normally at the regular commercial power voltage of 110-220 or 440 volts. They are available in a box type which mounts on a bench, or in a portable style with handles. The portable surface type demagnetizer is handy for demagnetizing pieces of work that cannot be moved readily. It may be used face up on the work bench or by grasping the handles and pulling across the "work." One pass of the work across the demagnetizing surface (at right angles to the insulating strips) is all


**ARMGLO**

Manufacturers of Resistance Welders—Foot, Motor, Air and Hydraulic operated.

•

Standard and for specific applications with and without electric timing control.

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Bench type filing and sawing machines and abrasive band finishing machines.

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**ARMGLO COMPANY**
Milwaukee, Wisconsin

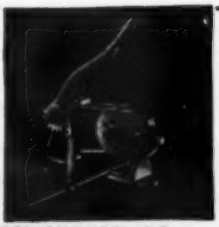


**THE WONDER CUTTER**

Cuts wire or rod up to ⅝ inch round (⅞ inch square) and band iron up to ⅛ by 2 inches.

Adjustable stop for repeated cuts to same length. Hardened cutters last indefinitely.

Powerful leverage makes all cuts easy. Small size permits placing wherever convenient.



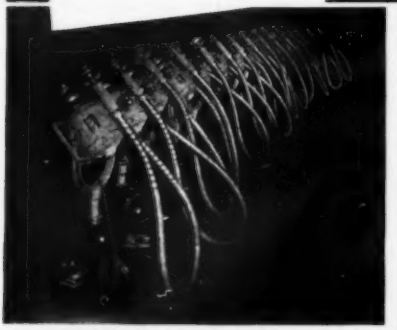
Small in size but a giant for work. The lowest priced rod and band cutter on the market. Every shop needs one. Hundreds in use.

You can get one for free trial in your own shop.

Write today for further details and price!

**THE FEDERAL FOUNDRY SUPPLY CO.,**
**4802 EAST 71st STREET, CLEVELAND, OHIO**

WE'VE
# DOUBLED OUR PRODUCTION
TO HELP YOU
# DOUBLE
YOURS!



*Part of a battery of Stow machines ready for shipment for big defense operation.*

Whether it's men or machine tools, working under pressure soon shows if they've got the "guts" to take it. That's why hundreds of shops working on National Defense orders are turning to Stow Flexible Shaft Machines. Every day, these sturdy, many-purpose machines are meeting the test-turning out more work in a full day's schedule—helping to get rush-production done on time!

# STOW
# FLEXIBLE SHAFT MACHINES

**PROMPT DELIVERIES**

Due to greatly expanded plant facilities we can make deliveries on any of our 14 standard model, heavy duty machines within 2 to 5 days from receipt of order!

*There's* a good reason for this *unfailing dependability*. Stow—the inventors of the flexible shaft—have been in business over 66 years. So, with Stow, you'll benefit from the most extensive flexible shaft experience in America. Let the name Stow be your guide in buying flexible shaft machines. It pays!

***Write for complete catalog NOW!***

## STOW MANUFACTURING CO., Inc.

**30 Shear St.** — **Binghamton, N. Y.**

*Established 1875* — *Inventors of Flexible Shafts*

**MODEL NO. 16 "SPECIAL"**

*Constructed as per Specifications of U. S. Naval Aircraft Factories*

Reg. U. S. Pat. Off.

Beware of Imitations! Our machine carries the Butterfly trade mark.

**BUTTERFLY FILING and SAWING MACHINE**

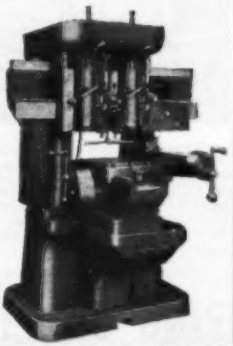
(Die Making Machine)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D-10" Table; Model No. L—12" Table.

**HARVEY MANUFACTURING CORP.**
**161 Grand St., New York**
**Phone: CAnal 6-5170**

**MOREY No. 12M *High Speed***
**Vertical Profiler and Miller**

Production of interchangeable parts requiring milling of any contour or outline can be materially speeded up by this Profiling and Milling Machine.



*Ask for Circular No. 680-A*

**Morey Machinery Co., Inc.**
410 Broome Street, New York N. Y.

that is necessary. These demagnetizers are powerful, and sometimes on small parts, gages, etc., a thin board or cardboard may be interposed between the parts and the demagnetizing surface. This facilitates handling and removal from the strong alternating field.

Although these demagnetizers are rated for intermittent service, they are constructed generally so they will not burn out even if accidentally left on the a.c. line.

A special variation of the Surface Type Demagnetizer is one that is oil-cooled and equipped with adjustable pole pieces. These are used for production demagnetization of the new magnetic alloys such as cobalt and alnico, in conjunction with special fixtures for demagnetizing large rings or bearing races.

Second, we have the Through Type Demagnetizers. These demagnetizers also operate on alternating current of commercial frequencies and voltages and are available in sizes from openings of a few inches to as large as three feet across.

The work to be demagnetized is dropped or passed through the demagnetizing coils. Hence the name. To operate, alternating current power is turned on, the work is passed through the demagnetizing coil and removed a distance of one to two times the maximum coil dimension, when the power may be turned off. For shops where heavy sections of hardened steel become magnetized, there are available extra heavy duty demagnetizers designed especially for this work. They are highly efficient and are designed to give a concentrated demagnetizing field through which the work is passed. The thicker the work, the more difficult it is to demagnetize completely and therefore these heavy duty demagnetizers require considerable energy and are only available for operation on the 220 or 440-volt power circuits.

# SPEED PRODUCTION QUICKLY *and* EASILY

## LIKE THESE FIRMS DID:

KELLOG SWITCHBOAD AND SUPPLY CO.
KOHLER CORPORATION
KOPPERS CORPORATION
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THE TURNER UNI-DRIVE
WITH FOUR-SPEED SELECTIVE SLIDING GEAR TRANSMISSION

SIZES
¼ to 20 H.P.

**A COMPLETE LINE FOR MOTORIZING ALL MACHINE TOOLS**—Users report 25% to 300% increase in production with reduced operating costs after installing Turner Uni-Drives. They are sold through dealers in most cities. In case a dealer is not located near you, write us for information and prices.

**SPECIAL APPLICATIONS**—The Turner Uni-Drive can be adapted to many special applications. 3 to 6 speed Selective Sliding Gear Transmissions. Submit your problems on special applications to us for solution and quotations.

**EASY TO INSTALL** — The Turner Uni-Drive can easily be installed in from one to two hours.

**GUARANTEED** — Turner Uni-Drives are fully guaranteed for one year. They are subject to return for full credit within 60 days if not satisfactory.

A FAST SELLING LINE
FOR WIDE-AWAKE DEALERS

**MFD. BY TURNER UNI-DRIVE CO**
*SALES DIV. TURNER MACHINERY CO.*
**1638 Central St., Kansas City, Mo., U.S.A**

The approximate current drawn on the medium size 220-volt heavy duty demagnetizer is 50-amperes and the equivalent at 440-volts is 25-amperes. The current may, at first, look high but is necessary if a real demagnetizing job is to be accomplished. The inherent characteristic of all demagnetizers is that they operate at low power factor, therefore the actual power consumed is considerably less than would at first be indicated by their current rating. Heavy duty Demagnetizers should "fit the job" and not be specified larger than necessary. This is urged because for a given power input, the efficiency of the through type demagnetizer drops off with increase in opening area of the demagnetizing coil.

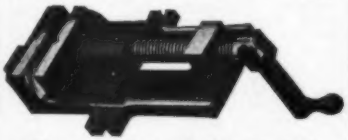
One pass through the opening while the current is turned on should demagnetize the work. However, it should be noted that if hardened parts are left in the demagnetizing coil while the current is switched "off," they will be found highly magnetized but may be demagnetized in the usual manner. This type of equipment is normally designed for intermittent service operation as this meets practically all requirements. In special cases, such as belt conveyors or strip mills, continuously rated heavy duty demagnetizers are also available.

One style, known as the 10" circular heavy duty Demagnetizer, features a ribbed cast housing for better cooling and protection. It is extremely efficient for demagnetizing objects that pass through the opening.

Magnetism has no place in the toolroom except where it belongs, in the magnetic chucks.

Now that demagnetizing can be rapidly and easily accomplished with standard equipment designed to meet particular requirements, there is little excuse to risk the presence of magnetized tools in the modern shop.


YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

| Vise No. | Width of Jaw, Inches | Opens Inches | Weight Pounds |
|---|---|---|---|
| 1D | 3½ | 3½ | 12½ |
| 2D | 5 | 5½ | 23 |

Do you need a vise of ANY type?

*Write today for bulletins on the extensive Yost line*

YOST MFG. COMPANY
1335 SO. MAIN ST.
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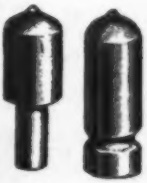

*FOR DEFENSE*

KARELSEN'S DIAMONDS KEEP THE WHEELS OF INDUSTRY TRUE

DIAMOND POINTED EMERY WHEEL DRESSERS
¼ KT. TO 10 KT.

IMMEDIATE SHIPMENT

*Send for Prices* *Specify Holder*

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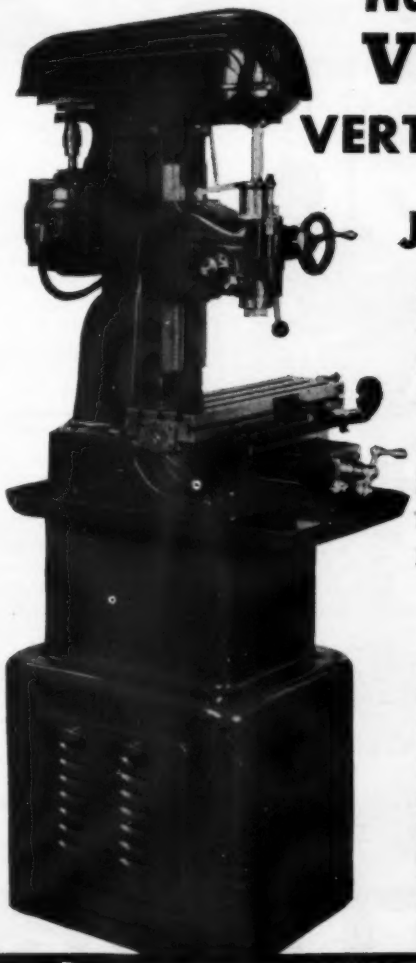
# New VERNON VERTICAL MILL & JIG BORER



Equipped with Dial Indicators and Measuring Rods as illustrated at left, the Vernon is invaluable for all types of smaller jig-boring operations. Relieves or replaces heavier, higher-priced equipment.

## SPECIFICATIONS

| | |
|---|---|
| TABLE SIZE | 6" x 21" |
| LONGITUDINAL FEED | 12" |
| CROSS FEED | 6" |
| MAXIMUM DISTANCE TABLE TOP TO SPINDLE END | 10¼" |
| QUILL FEED | 3" |
| 8 SPEEDS . . 250 RPM TO 4000 RPM COLLET CAPACITY | ½" |

MACHINERY MANUFACTURING COMPANY

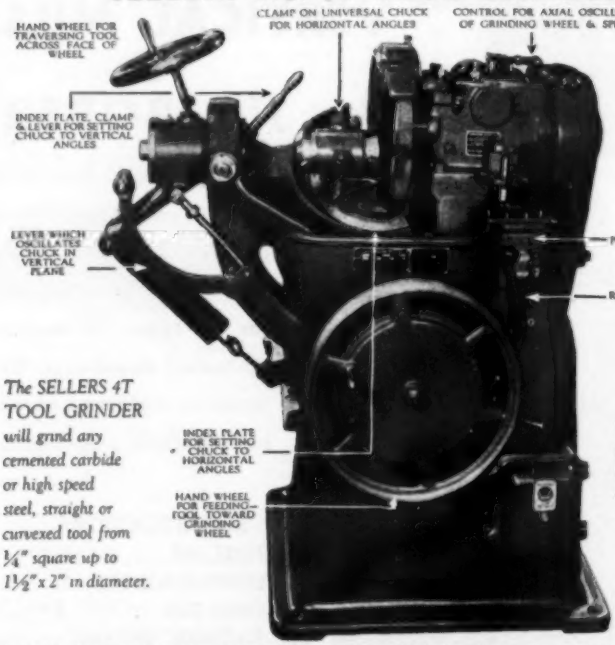
1915 EAST 51 ST. VERNON LOS ANGELES CALIFORNIA

*Vernon Line of* HORIZONTAL MILLS, VERTICAL MILLS and JIG BORERS, SHAPERS and GRINDERS

4074-P

KEEP PRODUCTION AT PEAK!—GRIND TOOLS ON SELLERS TOOL GRINDERS

# SELLERS No. 4T TOOL GRINDER


HAND WHEEL FOR TRAVERSING TOOL ACROSS FACE OF WHEEL
CLAMP ON UNIVERSAL CHUCK FOR HORIZONTAL ANGLES
CONTROL FOR AXIAL OSCILLATION OF GRINDING WHEEL & SPINDLE
INDEX PLATE, CLAMP & LEVER FOR SETTING CHUCK TO VERTICAL ANGLES
LEVER WHICH OSCILLATES CHUCK IN VERTICAL PLANE
PUSH BUTTON CONTROL
RATCHET HAND WHEEL CONTROL
INDEX PLATE FOR SETTING CHUCK TO HORIZONTAL ANGLES
HAND WHEEL FOR FEEDING TOOL TOWARD GRINDING WHEEL

*The SELLERS 4T TOOL GRINDER will grind any cemented carbide or high speed steel, straight or curvexed tool from ¼" square up to 1½" x 2" in diameter.*

*Write for descriptive bulletin and prices.*

WILLIAM SELLERS & CO., INCORPORATED • 1600 Hamilton St., PHILADELPHIA, PA.

# The "Buffer" School In Apprentice Training

By M. G. HEUER

THERE is general agreement among employment managers that most high school graduates and many of those from the vocational schools are not quite "ripe" for skilled work. There is just as general agreement that many older men who are pre-depression machinists and have been unemployed during the last few years can't be turned loose on precision work.

Yet, with the shortage of skilled men to work on defense orders, manufacturers are searching for ways to gear these potential workers as quickly as possible for production without danger of spoiling work or tools.

One of the most effective solutions to this double problem was worked out at the Harnischfeger Corporation, Milwaukee, Wis. when the defense rush began. It's an emergency training school that serves as a buffer between the school or earlier training in a trade, and the shop. It runs on a two-shift schedule.

Karl Schoeppner, in charge of the Harnischfeger Training School, discusses a problem with one of the apprentices.

**FELL** Precision Level

A precision "all-way" level for use in machine tool building, setting up and maintenance, whether for establishment of level working surfaces or for the accurate checking of straightness where true level itself is not required.

Graduations are in .0005" per foot and form squares about a circular bubble, thus giving coordinate readings and showing the direction and amount of slope, if any.

*Write TODAY for bulletin giving full details.*

**Wm. B. FELL COMPANY**
700 South St., Rockford, Ill.

**NIELSEN**
**Heavy Duty**
*Live Centers*

*Write for catalog on live centers*

Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

**NIELSEN, INC.** LAWTON, MICH.

On the day shift, an instructor guides about 25 beginning apprentices. They spend anywhere from two to six months in the "buffer school"—just long enough to get the feel of tools and to handle them well enough to do effective production work as they continue training in the production shop. On the night shift, about 25 older workers get a "refresher" course from a competent instructor—lasting from one week to several months, until they regain the confidence and precision necessary for worthwhile performance in the plant.

The three-year apprentice training period has not been shortened at this plant. Training has, however, been concentrated so that the apprentice becomes proficient sooner than he did before. During the last year and a half of his contract, the apprentice is put on an incentive wage basis. He is paid the same rate as that received by the journeyman with whom he works.

"This arrangement," says Mr. Albert H. Pfeiffer, Personnel Director, "enables our apprentices to get in on some of the high wages that men are earning now. Even more important to us, it steps up production to a remarkable degree."

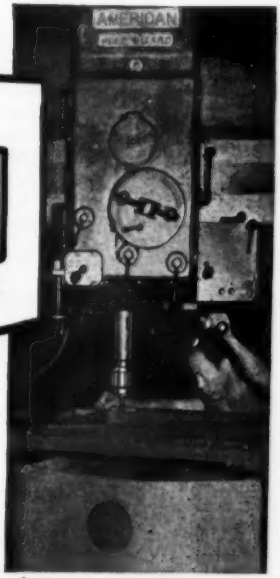
As far back as 1935, Walter Harnischfeger, President of the Harnischfeger Corporation, was concerned over the fact that fewer young men were being trained for key positions. The company established the policy of hiring more apprentices than business at that time would warrant. Now these skilled workers are operating machines and filling a real need.

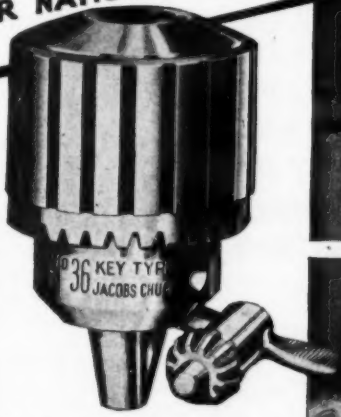
When the defense rush began, however, these workers were not enough. Orders poured in from the navy and arsenals, and from construction engineers for quick delivery of excavation and welding equipment. The factory pay roll climbed to 2200 men, the best in years, and still there were not enough skilled workers to fill the need.

THE NATIONAL

# STANDARD

FOR NATIONAL DEFENSE



# JACOBS CHUCKS

Operations showing the application of Jacobs Chucks to Aircraft Production. *Left*—Reaming job on landing gear struts at North American Aviation. Drilling Dural wing fitting at Consolidated Aircraft Corp. *Right*—Drilling aluminum oil tanks at Consolidated Aircraft Corp. Drilling Nacelle Jig job at Douglas Aircraft Co.

*IF IT'S A JACOBS—IT HOLDS!*

**THE JACOBS MANUFACTURING CO.**
**HARTFORD, CONN.**

The greatest shortage was in the machine line.

Harnischfeger's work is not of the repetitive type, so their problem was especially difficult. They tried putting on people trained in vocational schools or in national defense training programs, but found that this re-training was too general to meet the company's particular needs.

"All we could do was to pick them up from that point and train them ourselves," said Mr. Pfeiffer.

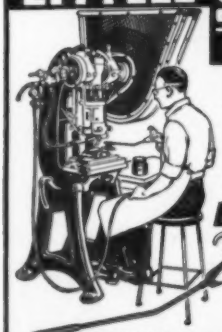
The building for Harnischfeger's training school is light and airy, with plenty of glass and modern ventilation. Most of the machines used are obsolete pieces of equipment reconditioned by the apprentices themselves. Hoist cranes were actually built by the boys as part of their learning job.

The essentials of 15 trades are taught to the 100 apprentices maintained by Harnischfeger. Not all of these, however, start in the special training school. Pattern makers go directly to the pattern shop, foundry apprentices to the foundry. It is mostly for the mechanical trades, where current shortage is heaviest, that the new school is utilized. Most of the youngsters center on machine shop work, sheet metal crafts, welding, and erecting and assembly work on the "big stuff" they see rolling out of the main plant.

Here an apprentice may be drilling to provide clearance for the shaft for a crane truck wheel. Near by another young man may be turning the shaft. A few feet away another apprentice is struggling to make a shaft fit as the crane platform takes shape. It's no go. The instructor comes and learns that the shaft is a trifle oversize.

Then there's a huddle. The lad from the drilling machine and the one making the shaft and embryo erecter are


LITTELL Pres-Vac SAFETY FEEDER



KEEPS HANDS OUT OF DANGER ZONE

**PRESSING** trigger creates strong vacuum in cup for holding flat-surface materials for feeding to press. Releasing trigger releases piece held. Keeps hands out of danger zone. Single and double-cup types.

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F. J. LITTELL MACHINE CO.
4153 RAVENSWOOD AVE. CHICAGO ILL.

LATHE STOP $15.00

PRICES GO DOWN ON QUADRUPLEXES

The Quadruplex Lathe Stop and Turret Tailstock help ease the production load by their multiple operations. Low cost, universal adaptibility and ease of attachment make QUADRUPLEXES a "MUST" on all lathes.

F.O.B. BLOOMFIELD, N. J.
IMMEDIATE DELIVERY FROM STOCK

TURRET TAILSTOCK $15.00

Dept. B 1 SPECIALTIES MANUFACTURING COMPANY INC.
35 FARRAND STREET, BLOOMFIELD, N. J.

# Weld it . . . then smooth it with KELLERFLEX

## Flexible Shaft Equipment that stands up under 24-hour-a-day schedules

THE increasing speed of our Defense Program is proving the vital need for top notch quality in equipment. Production lines must produce at high efficiency all day . . . *every day*. Kellerflex takes these emergency schedules in stride. Result . . . hundreds of sheet metal shops have standardized on Kellerflex. These powerful, compact flexible shaft machines and their large group of attachments and accessories are ideal for finishing operations. For complete data write to PRATT & WHITNEY, Division Niles-Bement-Pond Company, West Hartford, Conn.

# PRATT & WHITNEY

RELEASE LARGE MACHINES FOR HEAVIER WORK

PUT SMALL JOBS ON THIS LINLEY

VERTICAL MILLING MACHINE AND JIG BORER

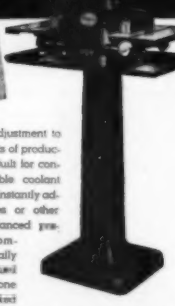
This machine is ideal for tool, die, fixture and pattern work. Is versatile, and accurate. Micrometer screw feed quill. Direct reading eliminates pencil figuring and possible errors. Smooth, accurate boring is assured to any predetermined depth up to 3".

*Write for descriptive Bulletin.*

LINLEY BROTHERS CO., 11 MONTAUK ST., BRIDGEPORT, CONN.

The CRITERION Carbide Tool Grinder

GREATER PRODUCTION CAPACITY



Provides positive rapid adjustment to meet the rigid requirements of production tool manufacturing. Built for continuous service. Adjustable coolant system. Large work tables instantly adjustable without wrenches or other tools. One-third H.P. balanced precision bearing motor completely enclosed and radially mounted in rubber. Standard equipment: One 60 and one 100 grit 7" dia. steel backed silicon carbide wheels. Ideal for metal bonded or Resinoid bonded diamond wheels.

Order from your dealer or write direct. Request literature. No obligation.

CRITERION MACHINE WORKS BEVERLY HILLS CALIFORNIA


shown the error. They exchange work and machines. The young fellow on assembly shifts over to the drilling machine.

"Why? To make these youngsters appreciate the need for absolute precision in production work, says Karl Schoeppner, in charge of the training school. "They know exactly why every part has to be right to prevent any hitch anywhere down the line, until the equipment has passed inspection and is ready for shipment."

Working together in the training school, there is time to teach new workers safety, the little tricks and methods that help a skilled machinist, techniques in getting along with coworkers. None of these things could be dealt with quite so effectively in the fast-paced production shop.

Even more remarkable than the day-shift course for apprentices is the night-shift program. Men who have been away from their trades often become so rusty that they would get fired from the regular production line before they could acclimate themselves to the pace. Here, they are turned into key men, responsible workers. One young man, for instance, finished his time as a machinist apprentice in 1930. Immediately he went up North, and the only job he could find in the town to which he moved was entirely away from his trade. When he returned for a chance at a job at Harnischfeger's a few months ago, he was put into the training school for a few weeks. Today he is an excellent machinist in the plant.

Another man, 55 years old, was taken on a few weeks ago. He had served his time as a machinist when he was a boy, but for the last 20 years he has been away from his trade. For the last 10 years he had worked as a shoemaker. It took him just one week to brush up on lathe operation, and to step into effective work on the production line.

# "FRONT and CENTER"

CJB AHLBERG

MAXIMUM CAPACITY RADIAL AND THRUST TYPE BEARING

## AHLBERG PILLOW BLOCKS

### *Serve* under severe conditions

**THE COMBINATION** of qualities found in this ball and socket, self-aligning pillow block distinguish it from ordinary designs. They make it preferable for jobs where performance and dependability are paramount.

Ball and socket design — easier to install — easier to align. Maximum ball type double row bearing. Great radial capacity — extra thrust capacity — smooth running at high speeds.

Patented adapter type shaft lock — assures full contact on shaft — positive lock — centers shaft — eliminates vibration — assures full capacity of bearing.

*Floating type Labyrinth* JL *Seals are most efficient* — keep out dirt and retain lubricant. Write for complete Bearing Catalog.

AHLBERG BEARING COMPANY

*Manufacturers of CJB Master Ball Bearings*

3009 West 47th Street - - - Chicago, Ill.

"Success of this program, however," points out Mr. Pfeiffer, "depends upon the care with which trainees are selected. You can't take a barber or a tailor who is a failure in his own field and always make a skilled mechanic out of him. After all, we are not humanitarians. We are out to do a job, and we need people who can be depended upon to help us do it."

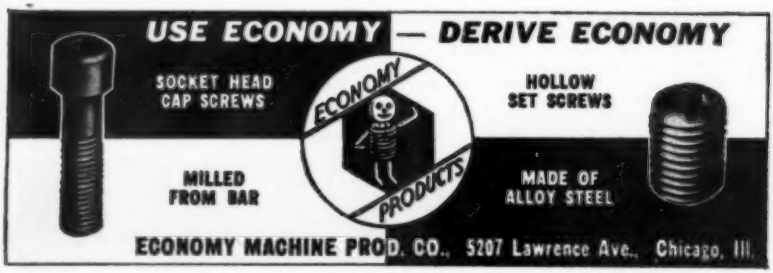
The first thing to look for in selecting men for trades is technical skill. But Personnel Manager Pfeiffer does not believe that this is the most important requisite for trainees. They must have potential skill, of course, but more than that they must have the will to use it. They must be willing and able to work with other people, and to get along with themselves. They must be able to handle their own personal affairs intelligently.

"Prospects for jobs usually tell us all things about themselves, if we give them a chance to talk for a little while," says Mr. Pfeiffer. "We find that the fellow who looks as if he hadn't bathed for a long time is likely to be shiftless in his work for us. The fellow who figures 'to heck with the last job' because he didn't get enough money may be a trouble breeder in our own plant. It is important, of course, not to fall into the danger of condemning a fellow before he has had a chance to give us his point of view. So we try to give him a chance to talk and to give us his way of looking at things."

High standards are also set for apprentices. High school graduation is required, and at least one semester of trade finding in the trade in which they are interested, not that the company depends on this school training. The personnel manager has found, however, that this preliminary exploring in a trade-finding course helps boys to discover their likes and dislikes so that they are not disillusioned when they come to work in the shop. The Milwaukee vocational schools have excellent courses along this line. By choosing apprentices who have taken one or more of these courses, Harnischfegers have reduced apprentice-turnover to a negligible figure.

Each company's training program, of course, must be fitted to its individual needs. Each company must analyze its own labor shortage, and how much skill is required by workers in these special fields. Each company must decide what is the shortest possible time for training workers for these jobs.

The Harnischfeger program, however, has points of interest for many a firm where highly skilled workers are required. It's keyed to individual needs of workers, so that each trainee is stimulated to do his very best job. It's easy to set up, requiring only a special room and a few pieces of re-conditioned equipment. It is at least one solution to the pressing problem of utilizing workers not quite ripe for the fast production pace required in factories today.

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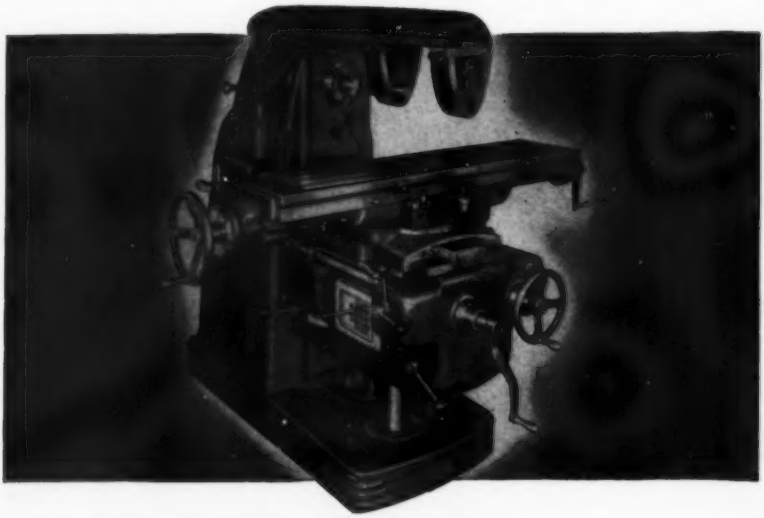
# Van Norman Announces Another New Miller . . .
# THE No. 3-S PLAIN HORIZONTAL



No. 3-S sets new standards of operating convenience for machines of its capacity. In fact, operators find it almost as easy to control as the cars they drive to work. For this is the only miller of its size with a single-lever speed selector that puts a range of 18 speeds (high and low series) right in the palm of one hand.

**No. 3-S PLAIN HORIZONTAL KNEE-TYPE MILLING MACHINE**

(Specifications)
Table: 64" x 14"
18 Speeds: 25 to 1250 r. p. m.
18 Table Feeds: ⅜" to 32"

Also, a range of 18 feeds are selected in the same way. And what is more . . . the table, knee and saddle move in the same direction as the control levers, which are placed right at hand both at front and rear of the machine. Table dials are 6" in diameter, to assure accurate reading of graduations.

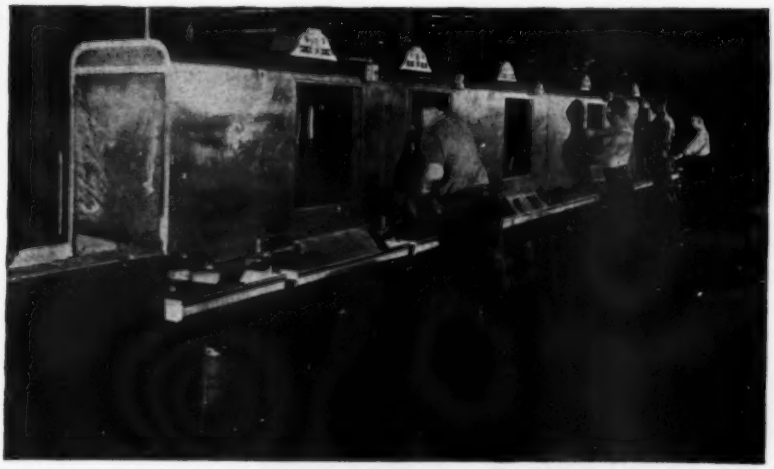
To these exclusive advantages in operating convenience, Van Norman has added structural strength and rigidity more than ample for all jobs within the machine's capacity . . . including a special bull-gear spindle drive to permit the heaviest cuts. From top to toe, the No. 3-S Horizontal Miller has the sturdy and advanced design to hold for years the place it has taken in the vanguard of work for defense.

**VAN NORMAN MACHINE TOOL COMPANY, Springfield, Mass.**

# Reducing Hardening Rejects

HEATING time for hardening crankshafts has been cut from 12 hours to less than 5 minutes by 2000-cycle inductive heating at the Chicago tractor plant of the International Harvester Co., it is reported. Involving five different sizes and types of shafts for Diesel and gasoline engines, the method has simplified balancing, obviated the normal pickling processes, and increased core toughness. With this installation, which was the first licensed by the Ohio Crankshaft Co., it is asserted that more than 2 million shafts have been so produced without a rejection for incorrect hardness.

Formerly the drop-forged shafts were normalized, hardened and drawn, pickled or shot-blasted to remove scale, then machined and ground. Though durability of main bearings and connecting-rod bearings is almost directly dependent upon their hardness, this physical property was limited by machining operations after hardening. Carburizing these particular shafts was not a practical means of increasing hardness, because distorted shafts could not be satisfactorily straightened afterward. Final hardness was between 25



The Tunnel Line has 9 stations, all supplied with 2000-cycle power from a 300-Kw. Westinghouse generator.

and 30 Rockwell C. Shafts are now normalized, completely machined except for final finish, then heat-treated on the bearing surfaces only to a hardness of from 55 to 62 Rockwell C, drawn at 350 degrees Fahrenheit, and ground. Pickling is no longer necessary, since inductive heating introduces no scale. Using conventional hardening methods, shafts previously were made of a nickel-alloy steel of the 3100 series, which has been made currently almost unavailable by defense restrictions. With inductive heating, the more costly nickel steel has been replaced by a readily available carbon-chrome steel. Total rejections for metallurgical defects have been cut from the previous 5 per cent to an average of less than 1 per cent.

Shafts are now balanced on a Dynetric balancing machine at the rate of from 12 to 15 per hour, depending on size. Drilling for balancing is controlled automatically. This operation also is simplified as a result of inductive hardening, because distortion in heating is almost negligible; consequently the amount of material removed from crank throws is less.

This is one of the 6 upright heating stands.

Main bearings and connecting-rod pins are hardened one at a time in six upright stands and a nine-station tunnel line. Heating cycle is only 4 ½

Setting the vernier control which times the various phases of the heating cycle. As the bearing heats, its resistance to the high frequency induced current changes, so power input must be changed correspondingly to keep heating rate uniform. Inductive heating collar is confined to bearing to be hardened, and heating cycle is about 4 seconds.

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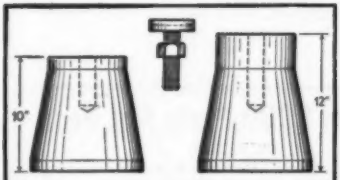


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**SOUTH BEND TOOL & DIE CO.**

Shafts are dynamically balanced at a rate of 12 to 15 an hour. This Dynetric machine computes and transmits amount of unbalance to nearby drilling machine, which automatically drills shafts at correct points and to the proper depth for accurate balance.

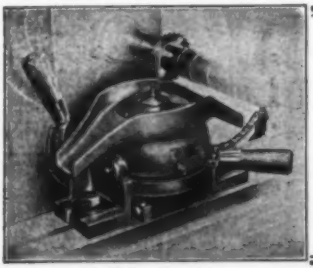
seconds for main bearings and 4 seconds for connecting-rod bearings, followed by a water quench. Length of the heating cycle is automatically controlled by a timer driven by a synchronous motor. Power, fed to the heating stand by the generator, is increased automatically by the timer as the heated metal reaches the nonmagnetic state and heating effect decreases.

Power for the tunnel line and two of the upright stands is supplied by a Westinghouse 300 - kw - 2000 - cycle generator. The other four upright stands are supplied by a similar machine rated at 250-kw.

Current Harvester shafts are said to take a better final finish than those produced by the old method, because of their increased hardness; and breakage of shafts in service has been reduced materially because of the increased toughness of the shaft core. Production is now about 4200 shafts a week.

International Harvester Co. uses inductive heating for other tractor parts, including track rollers and track link pins. Two separate upright heating stands are used for rollers and one other is used for pins. These stands are supplied by a 300-kw generator.

(Photos—Courtesy Westinghouse Electric & Mfg. Co.)

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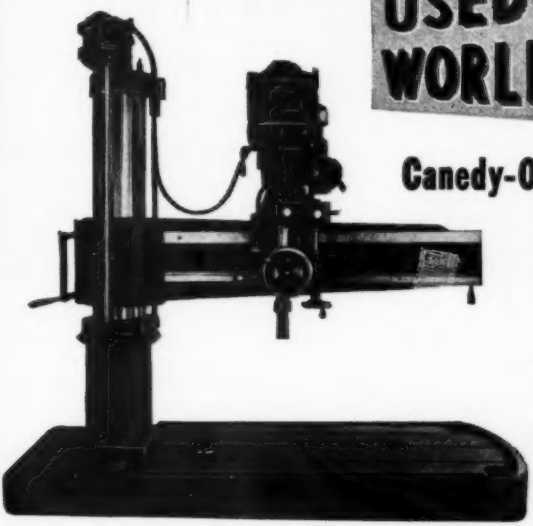

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We can help you solve your drilling problems. Send for information on our complete line

*Early delivery possible.*

## SPECIFICATIONS:

| | 9" Column 3' Arm | 11" Column 4' Arm | 11" Column 5' Arm |
|---|---|---|---|
| Drills to the center of circle on base or table | 73½" | 98" | 120" |
| Length of arm | 3' | 4' | 5' |
| Greatest distance from spindle to base | 43½" | 48" | 46" |
| Minimum distance from spindle to base | 9½" | 15" | 17" |
| Minimum distance from spindle to column | 10½" | 10" | 10" |
| Traverse of spindle | 9½" | 9½" | 9½" |
| Hole in spindle—Morse Taper | No. 4 | No. 4 | No. 4 |
| Diameter of spindle at nose | 2½" | 2½" | 2½" |
| Traverse of head on arm | 25½" | 36½" | 42½" |
| Traverse of arm on column | 21½" | 24" | 22" |
| Spindle speeds with 1200 RPM motor | (60, 85, 130, 180, (425, 560, 860, (1200 RPM | | on all models |
| Spindle speeds with 1800 RPM motor | (85, 130, 180, 274, (560, 860, 1160, (1750 RPM | | on all models |
| Feeds per revolution of spindle | (.004" .007" (.010" .020" | | on all models |
| Bearing of arm on column | 14" | 16" | 18" |
| Size of main driving motor | 2 HP. | 2 HP. | 2 HP. |
| Height of drill column over gears | 88" | 88" | 88" |
| Working Surface of Base | 25"x45" | 30"x60" | 30"x88" |
| Net weight | 4000 lbs. | 6200 lbs. | 7000 lbs. |

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**MACHINE TOOLS**

**Bridgeport, Conn.** **United States, America**

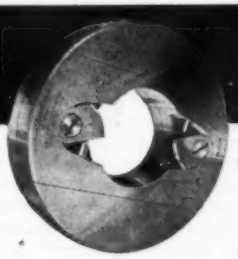
# Designers' Requirements — Good Tools

By H. F. WILLIAMS

THE designing engineer and draftsman finds at this time that the tempo of his profession has increased. Drafting time on National Defense and other orders must be completed more rapidly and in many instances, this means working longer hours. As in the metal working industries, building trades and other associated fields, a good workman is recognized as such by the tools he owns and uses, so is the designer and draftsman rated accordingly. Because the average man in this profession must work as fast with his fingers as with his thinking capabilities, he must have highly accurate and quickly manipulated drawing instruments.

It is generally conceded among a common cross section of draftsmen, that the most important tool they use other than a lead pencil is a drawing compass. In fact, many men are equipped with but few additional instruments and seem to get along as well as the fellow who has "the works," with everything in the drawing accessory line from A to Z. These drawing compasses may be roughly divided into two classes, viz., the pencil bow compass for drawing smaller circles and the beam compass for the larger circles.

When many of us left school, we were presented from one source or another, with a leather case, velvet lined, containing a standardized set of drawing instruments. Among these was a longer of two compasses to be used for drawing large circles. If, after the legs were bent to a near perpendicular with the drawing paper, and the compass failed to reach the arc desired, a lengthening bar was inserted and the circle completed. But what a circle it was. It was found that no pressure could be exerted on the lead point for clear blueprinting lines and if it was, the result would be concentric or even eccentric

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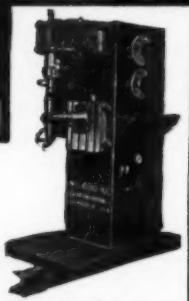

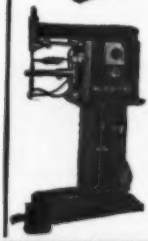

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circles instead of a single solid black line.

Before commenting on the larger type of instrument, the first mentioned or pencil bow compass will be discussed. There are several kinds of these instruments, differing only in the principle of construction. The first is a fork spring type with the adjusting screw pinned to one leg of the fork and protruding thru a hole in the other leg where a knurled nut makes the adjustment. It can be manipulated quickly by squeezing the two legs together, thereby expanding the spring and spinning the nut along the free screw. This, however, requires the use of both hands, which in many cases are not always free. And then too, when drawing a circle at the upper extreme, there is a lack of stiffness just when it is needed. Stiffness and rigidity are greatest when drawing circles of the lower extreme. After the spring portion becomes too weak when opened for drawing large circles, a wedge shaped piece of eraser can be inserted in the upper end of the fork, exerting pressure between the screw and nut thereby taking up thread backlash. However, the duty on the screw and nut is increased when the compass is adjusted for small circles, as the rubber must be compressed too much.

The next type of pencil bow compass is the hoop-spring type with center screw adjustment. In this design, the knurled knob is integral with a right and left hand threaded screw engaging oscillating nuts mounted in the two legs of the compass. The nut cannot be spun fast as in the other type, but has the advantage of being adjusted for various sizes of circles by the use of only one hand. This is done by sticking the pin into the paper on the board and turning the knurled knob between the thumb and middle finger. Speed of manipulation depends, of course, on the

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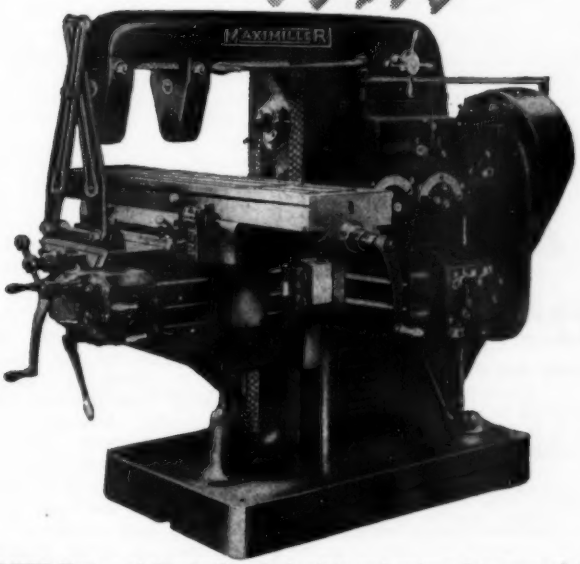
# MAXIMILLER

## *for Aircraft and Defense Production*




The KEMPSMITH Horizontal Maximiller—both plain and universal types—and the Vertic Maximiller are most desirable for Aircraft and Defense Production. They combine power wi flexibility and precision. These machines have the features and operating conveniences whi make them particularly adaptable for both light and heavy manufacturing problems.

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Other KEMPSMITH products include: Dividing Heads, Heavy Duty Vertical Attachment, Hi Speed Universal Attachment, Slotting Attachment, Vises, Arbors, Rotary Tables.

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**T. C. M. MFG. CO.**

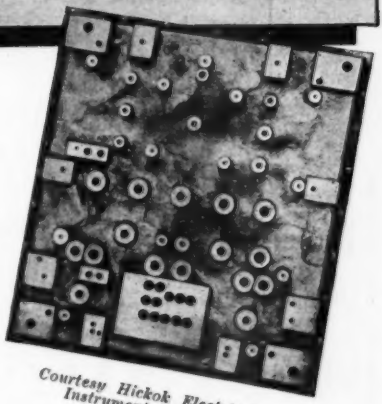
**HARRISON, N. J.**

**SINCE 1910**


pitch of the screw. Some instruments have fine threads while others have coarse threads. Because of the short length of thread in engagement, the coarse threaded unit gets looser by constant use sooner than the fine threaded screw. And once looseness develops, the compass might just as well be thrown into the scrap heap as it cannot be relied upon to make accurate circles. To increase speed when using a fine threaded instrument, the knurled screw wheel need only be pressed against the drawing board and the compass pulled along thereby rotating the screw, either opening or closing the compass legs. Because the spring hoop is above the fulcrum point, this type also becomes weak when drawing larger circles and vice versa. Here, also, a rubber wedge may be inserted between the upper ends of the two legs inside the spring hoop. This method of backlash takeup, which also gives additional spring tension, works opposite to that of the first mentioned type. The rubber wedge is compressed when drawing large circles and released or expanded when drawing small circles, just where and when greater spring pressure is required.

So far in this article, German-made instruments have been discussed. A year ago it became exceedingly difficult to obtain such instruments and it would seem that this was sensed in this country. A number of lower grade instruments made their appearance. Some of these are rather poorly made. Alignment seems to be ignored, pivoting fulcrums are loose and incorrectly designed and adjusting nuts are not anchored on some instruments. Apparently, lack of experience or hasty design accounts for some of the material being sold to draftsmen today. The average board man is willing to pay a reasonable price for his instruments, but one thing he demands is accuracy of fit, ease of manipulation and depend-

# SAVE DIE STEEL *by using bushings held in* CERROMATRIX



*Courtesy Hickok Electrical Instrument Co.*

In these days when defense requirements make die steel a precious metal, why waste it by using solid hardened steel die plates? Tool steel bushings will serve the same purpose and they can be secured quickly and accurately with CERROMATRIX on a flat steel plate. The method of making such dies is fully described in the Cerromatrix Manual, which will be sent free on request. This is only one of many ways in which low-temperature-melting non-shrinking Cerro Alloys are serving and saving in metal-working shops.

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ability rather than a lot of chromium plate on cheap material.

The compasses discussed to this point have a range only up to approximately 3½" diameter circles. It was only natural for the designer to demand of the instrument maker that he design a compass to fill the gap between the small pencil bow and the larger beam compass. This, of course, is other than the regular combination compass sold with a set of instruments including change of pencil, inking, and divider points and a lengthening bar. The designer wanted something more rigid and reliable.

A compass became available some time ago made by an American firm to scribe a circle up to 6" diameter. The same principle of adjustment was applied as was used on a tool makers spring caliper and divider, viz., the use of the spring or split nut. By application of this nut, the compass legs could be squeezed together and the nut pushed to the approximate location desired and then screwed by the knurled head to exact size. At this time, the split nut was made to hug the screw on both sides and become a completely integral nut. The opening between points was approximately 3", but a circle with this radius could not be made because the point could not be punched into the paper at or near perpendicular. Also, because of the comparatively short legs and an unusually long adjusting screw, the instrument was clumsy and unbalanced. It was considered a two hand instrument by those who used it.

Another pencil bow compass, larger than the last mentioned, is available for drawing circles up to 8 or 8½" in diameter. This instrument is approximately 5½" overall and is sturdily built of nickel silver and tool steel. It is operated by a right and left hand threaded screw with center wheel ad-


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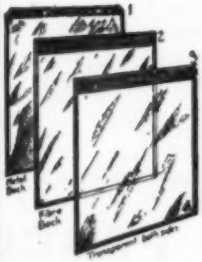

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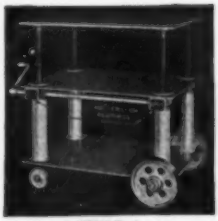

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WILL SHIP ON 30 DAYS TRIAL | **EVANS FLEXIBLE REAMER CO.** Ravenswood & Wilson Ave., Chicago, Ill. | WRITE FOR CIRCULAR

justment and has a heavy hoop spring gripping the compass legs very near the fulcrum pin. The adjusting screw is ⅛" in diameter and has 36-threads per inch. Both ends of the screw operate in pivoted nuts, made of what appears to be some type of brass or other yellow metal. It is claimed that the compass is balanced for speed and smooth effortless operation.

Because it is made of unusually heavy section, in places the metal legs being ¼" square, this compass is heavy to the touch, weighing 2 ounces. An instrument of this weight is quite heavy in comparison to a smaller bow pencil that weighs but a small fraction of one ounce. The consensus of opinion in an engineering office of 100 is that one must become accustomed to such a load. In the big hand of a large man, this compass can be operated with but one hand, but the average size hand is not adaptable to such operation.

It is surprising the amount of backlash or screw looseness that is manufactured into some of our high grade instruments. It is also surprising to note the rapid wear that develops in brass or near-brass nuts. Any looseness here multiplies about 2½ fold at the business ends of the compass.

The way to test a compass when buying is first to note the alignment of the two points. Then take hold of these two ends at various points of adjustment and wiggle back and forth for screw shake. It would seem that the instrument maker should make these important elements of the best material obtainable, and also with the greatest precision. Screws made with threads toughened by heat treatment and nuts of hardened tool steel should be used. Both should be lapped in to obtain the best fit that can be produced.

Of course, the draftsman is not always to be held blameless. There are many who work into their designs, elaborate and highly efficient lubricat-

**The "BABY GIANT"**
**VANDERBEEK Universal Joints**

are obtainable in two sizes—the "Baby Giant" for instrument and control work; and the "Giant", with hardened and ground working surfaces for heavy duty work.

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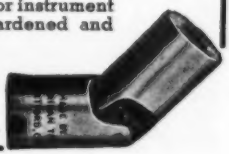
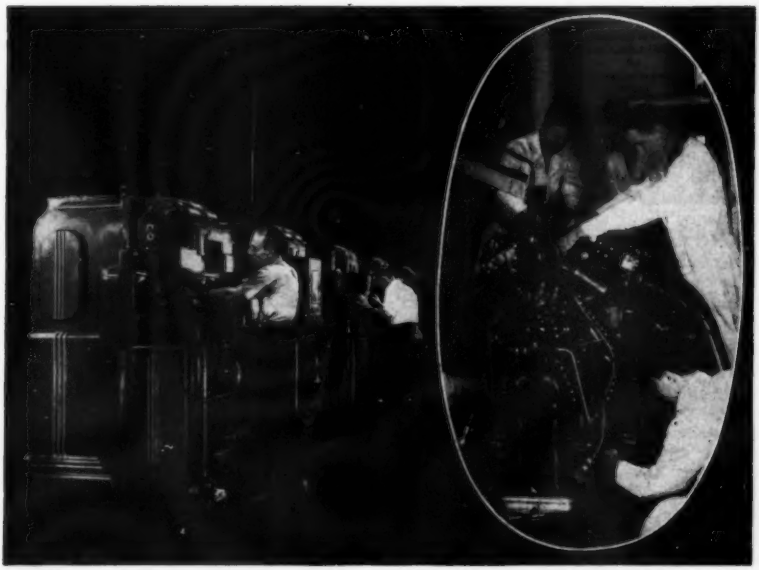


**AMERICAN TOOL WORKS, INC.**
26 FRANCIS AVE. -:- HARTFORD, CONN.



# Packard Shaves *and* Merlin Ticks

**SWEETEST music to a fighter pilot's ear just before the take-off is the smooth ticking-over of his warming engine that signals him that every vital part of his engine is "Right."**

**When on August 2nd, Packard's first Rolls-Royce "Merlin" was started from London by radio, its sweet ticking was music to many ears. Music to the pilots who will soon be flying behind them by the hundreds and thousands.**

**Music to Packard's Design and Tool Engineers, who in ten short months had magically transformed a bundle from Britain — 2000 left-handed blueprints — into an engine built by American mass production methods on American machines to the closest of tolerances.**

**That ticking brought to within a short step the time when identical "Merlins" by the hundreds and thousands will swing off the end of Packard's new line—smoothly ticking Merlins equipped with gears shaved on a battery of Michigan rotary gear finishers to match the rigid specifications of Packard's new aircraft engine.**

*Above, left: Part of the battery of Michigan 660-B rotary gear shavers used at Packard for finishing gears for the new Rolls-Royce "Merlins."*

*Right: Packard's first Rolls-Royce "Merlin" being readied for its first official test.*

*Close-up of one of the Michigan gear finishers at Packard. These finishers employ the famed Michigan crossed axis shaving principle.*

**MICHIGAN TOOL COMPANY** 7171 E. McNichols Road Detroit, Michigan

ing systems and methods. Also many of these same men sit in squeaky chairs, squeaky from lack of a drop of oil on the offending parts. These are the men who do not think that the adjusting screw and nut on the compass require a drop of oil occasionally. The designer who has no can of oil in his kit can be classed as one contributing to lack of efficiency.

Recently, another bow pencil compass made its appearance on the market. It is claimed to be lighter, stronger and having greater capacity than the others. It is 6½" in overall length and will describe a circle between 10 and 10½" in diameter. Lightness of weight is accomplished by using an open truss construction in that the legs are each made of two pieces of sheet steel. Near the pencil and center pin extremities of the legs, the double pieces are spot welded together. To keep down weight, the center screw thumb piece and the handle above the hoop spring are made of dural. The weight of the instrument is approximately 1¾ ounces and for all its length, feels quite "light" in the hand.

The center controlled adjusting screw is ⅛" in diameter and has 40 threads, right and left hand, per inch. Large cylindrical nuts in the legs are made of steel. It is gratifying to note that there is no slack in these nuts at either extreme of the range of the compass. It has been found that, as with other types of large bow pencils, this is a one hand instrument when drawing small circles. However when larger diameters are required, two hands are necessary for manipulation. Because the center pin is large in diameter compared to other types, the instrument must be tilted to a fairly flat angle to insert the pin point where required. It would help if the pin were tapered above a longer needle point to facilitate visually, the location of the given center.

In both of the latter mentioned in-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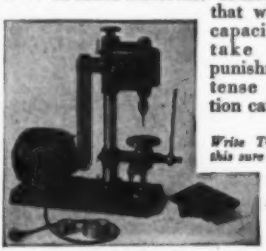
with the A. M. Sensitive Tapping Machine . . . from the smallest and finest up to 3/16" diameter in steel and iron—and up to ¼" in softer materials. A modern unit that within its capacity, will take all the punishment intense production can inflict.



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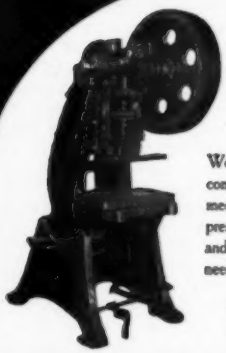

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## WET-DRY BELT GRINDER

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Here's the machine that's made production men all over the country sit up and take notice. Belt-grinding that's never before been achieved —*precision belt-grinding!*

Yes, it's fast—belt-grinding always has been. But the important thing about this new Porter-Cable Wet-Dry Belt Grinder is its *accuracy*. Working "free hand" you can hold to .001"; or with simple, inexpensive jigs, to as little as .0005"!

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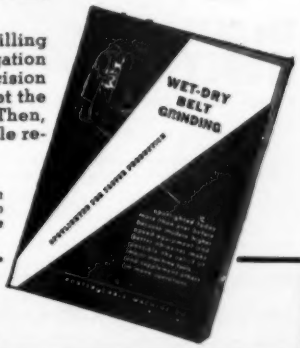
In plant after plant, you'll find these belt-grinders "taking over" operations formerly done by millers, surface and disc grinders, trimming cutters and other tools—releasing major machines for other work—practically eliminating set-up time. They work hard metals, soft alloys, aluminum, magnesium and plastics without abrasive clog. They're speeding up work . . . increasing production . . . saving money!

Every word is cold, hard fact we're willing and anxious to prove to you. Without obligation we'll *demonstrate* what we mean by "precision belt-grinding" on one of your own jobs. Let the results speak for themselves. Fair enough? Then, drop us a line or call your local Porter-Cable representative **RIGHT NOW!**

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**Safely**
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**The "27" MOREY**
**Semi - Automatic Heavy Duty LATHE**
Just the Machine for Shell Work !
Suitable for rough or finished turning shells at maximum feed.
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Multiple tool holders can be supplied at front and rear; a turret mounted on separate saddle can be used instead of tailstock.
Full use of carbide tools can be taken by this heavy duty lathe. *Ask for Circular No. 715.*

**Morey Machinery Co., Inc.**
410 Broome Street, New York, N. Y.


struments, the pin and pencil are set at an angle when the compass is fully closed for small circles. When it is extended for large circles the angle changes to the other side of perpendicular a like amount. In other words, both pen and pencil are perpendicular when the compass is set at approximately the center of the range of diameters it can accommodate.

To provide lightness of weight, another compass of 7" capacity has legs made of a non-corrosive alloy similar to dural. This metal has the tensile strength of hard brass and is chromium plated to guard against tarnishing. Other parts are made of stainless steel. This particular type is a side adjustment compass having a very fine pitch thread. A feature not found in other similarly large sized instruments is that the centering point pin is mounted in a pivoting holder. This is to allow the pin to be positioned approximately perpendicular to the drawing board surface when scribing any size circle within the range of the compass. The pin holder is held by friction at any desired angle. While this instrument is exactly light in weight as compared to other makes, alignment of points and thread backlash might be improved.

So far in this discussion, only the bow types of compasses have been mentioned. For drawing larger circles and curves, many engineering offices supply beam compasses in the several departments, capable of scribing circles of 10 or 12 feet or even larger. For stiffness, the beam, usually made of wood, has an I-beam section or a similar shape. However, a range of circles from approximately 7 or 8" to 24 or 25" is quite common in machine tool and other types of layouts. The average designer today needs such a size of instrument so often it is a handicap to rely on his turn to use the larger company-owned beam. Consequently, beam

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## MALL TOOL COMPANY

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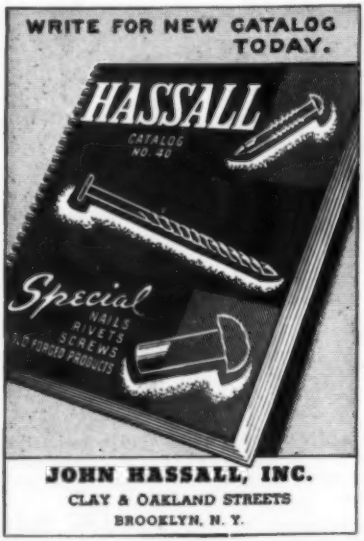
*Manufacturers of over 200 gasoline engine, air and electrically operated tools and attachments.*

compasses are available, having a metal beam approximately 13" long.

As with bow compasses, many beam compasses used, but not all were manufactured in Germany. In some drawing rooms, German beams predominate, probably because of design foresight to chromium plate over brass. The use of chromium makes an eye as well as sales appealing characteristic and in many instances, was the deciding factor when the sale was consummated. But these beams are difficult if not impossible to produce now. However, there are American makes on the market at moderate prices. Because of National Defense demands, some of these also are difficult to obtain.

The designs mentioned, whether of American or German origin are quite similar in construction. Both the pencil chuck leg and the long handled centering pin part are adjustable along the beam and tightened with knurled nuts. The beam is a round steel rod flattened slightly along its entire length for aligning correctly both legs when clamping with nuts and both solid and spring washers. In the American instrument the beam is 5/32" in diameter. In the German make it is about 3/16" in diameter, being stiffer and more rigid for larger circles. Some draftsmen have a 2 foot piece of drill rod ground flat for radii larger than the standard beam of 13" length. However, as stated, rigidity is not inherent in such small diameter beams as but slight pressure on the points when describing a circle will sag the beam in the middle, thereby causing multiple lines instead of but one.

In the American make, the compass is available in both polished steel and nickel plate. The former tarnishes and rusts quickly for many draftsman because of acid content in hand perspiration, but this does not impair manipulation. The plate of the nickeled instru-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# On Facing Cuts

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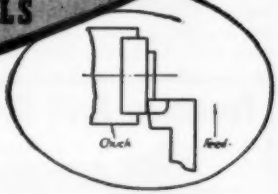
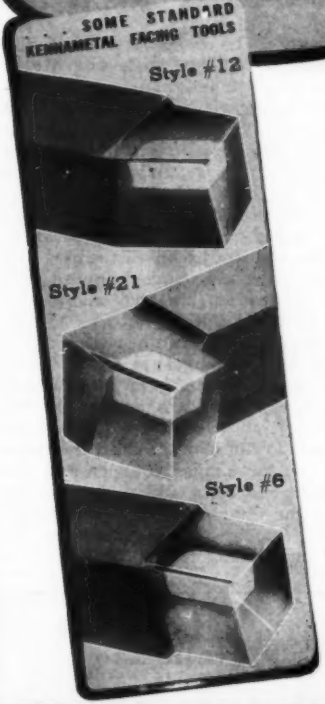
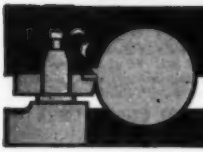



Facing cuts on hard steel parts require a tool carbide that is ***versatile***—one that will perform equally well under the high peripheral speed on the outer diameter of the work piece, and under the slower speeds on the inside as the tool moves toward the center.

KENNAMETAL is the ideal carbide tool material for facing steel—because it can be used at very high speeds without excessive tool wear on the outer diameters and at slower speeds as the diameter becomes less without "picking up" steel particles from the work piece. Spindle speed can remain constant.

If you turn, bore, or face ***steel*** on lathes, turret lathes, boring mills or automatics—specify KENNAMETAL for maximum production and long tool life. **Standard and Modified Standard KENNAMETAL tools are shipped within ten days of receipt of order; Standard tool blanks within three to four days. Certain commonly used standard tools (rough ground with grade KM tips) are carried in stock for immediate shipment. Write for our new Catalog No. 42 and weekly stock sheet.**



McKENNA METALS Co.

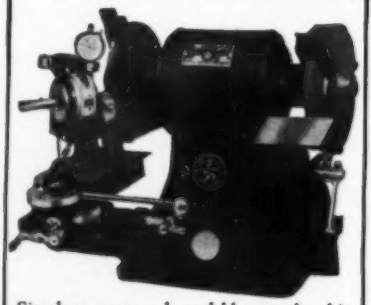
135 LLOYD AVE., LATROBE, PENNA.

FOREIGN REPRESENTATIVES: U. S. STEEL EXPORT CO.
Exclusive of Canada, Great Britain and Possessions

ment wears off too quickly. The opinion of some is that this instrument should be chromium plate for better appearance and longer wearing life. Because this instrument is also used for laying out circles and curves on metal, in which steel points are used, it is necessary to get compass legs with the correct size hole and chuck. Pencil leads, except in some cases, are approximately 0.075″ in diameter. Consequently, the compass must be ordered with a 0.076″ hole instead of an 0.086″ hole, or the lead cannot be clamped tightly. The mistake is made frequently. To rectify it, a split bushing must be made to encompass the lead. A piece of 0.005″ sheet steel or brass is cut about 5/16″ long and not quite the circumference of the pencil lead in width. This bushing can be placed in the chuck and the ordinary spring of the material exerts enough tension and friction to keep it in place when changing or replacing pencil leads.

In both of the designs mentioned, the instruments could be made to sell at a lower price if the non-essential, so-called micrometer adjustment were eliminated. This is a fine pitch screw and nut arrangement, which moves integrally for quick adjusting and separately for fine adjustment, with the center pin leg. Here, three parts could be discarded because from observation, the average draftsman disregards and does not have time to fool around with fine adjustments. In fact, many take these parts off entirely. If fine adjustment is required, it can be accomplished readily by clamping loosely, the leg to be moved. Because there is a humped lock or tension washer under the clamping nut, enough friction can be provided to slide the leg along the beam in a manner similar to operating the hairline slide on a slide rule, viz., by rolling the thumb and finger after sufficient gripping pressure has been exerted by the fingers.


**Precision Drill Grinder**



Simple to operate—dependable—speedy—this Precision Grinder will enable you to produce perfect points on standard twist drills in sizes from No. 41 (.096) to ½" (.625).

*Send today for more details.*

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These files are available in a number of different styles and sizes, in either High Carbon Steel or High Speed Steel.

Send for catalog showing a wide variety of standard shapes and special shapes. Perhaps we have what you want in stock, if not, we can grind it.

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If you have need for special shape Files, we shall be glad to submit the desired File for your approval and trial upon receipt of a sample or sketch.

This service is designed especially for your convenience, for which we make no charge.

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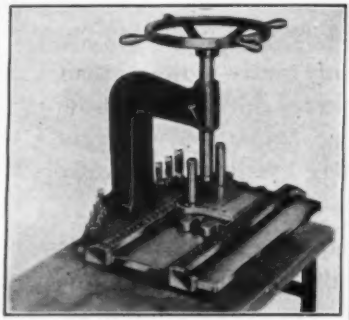
# Save TIME TAPS TROUBLE with the New VIKING TAPPER



You save time because the Viking Tapper eliminates the wasting of valuable time by highly paid skilled men trying to tap holes accurately by hand. One fifth the time is required.

You save taps because tap breakage is practically done away with. This enables the use of high speed ground thread taps at lower cost than carbon taps. The savings on taps alone will pay for the tapper in a short time.

You save trouble because Viking Tappers take the trouble out of tapping.

For Precision Tool Room Tapping use the Viking Tapper. Capacity 1/4" to 3/8".

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**THE VIKING TOOL & MACHINE CORP.**

**14 MAIN ST., BELLEVILLE, N. J.**


Another type of beam compass of American manufacture is available, having several commendable features. A beam of aluminum is used for weight reduction, which is of hexagonal cross section measuring 7/32" across flats and obtainable in lengths up to 48". Although stiffer than a round flattened rod of smaller diameter, as in the afore mentioned instruments, this hexagonal bar is also capable of bending or sagging between pivot and pencil points when they are too far apart. Another feature not found in like beams is that a short hexagonally shaped pivoting handle is provided integral and above the two legs. With these handles firmly held between thumb and finger of each hand, a circle can be described without the necessity of rotatively sliding the handle in the grip of the fingers, very similarly to the operation of a "Yankee" type screw driver. This manufacturer had foresight enough to provide his instrument in four various styles, with or without pivoting handles and micrometer adjustment. Consensus of opinion on this instrument is that although very light in weight, it looks clumsy because of the necessarily large parts. Another suggestion is that the pivoting handles are quite convenient when drawing circles of solid lines, especially on large circles where long sweeps are used when making them. But when dotted line circles or curves are made, these handles become useless. It was found that on an average in machine design and detail work, equally as many dotted circles are made as full line or solid circles. In making dotted line circles, especially when the pencil lined tracings are to be blueprinted, the points of both legs must be controlled more rigidly, especially the pencil point when making the short, even length and evenly spaced dots or dashes which comprise a dotted line.

Another light weight beam compass has made its appearance on the market

# THE NEW BENCH TYPE *Logan Lathe*

- 10" swing, 24" between centers
- Bed 6 15/16" wide by 43 1/8" long
- Prismatic V and flat ways, Hand scraped & honed
- New Departure Precision Pre-loaded Ball Bearing Headstock Spindle.
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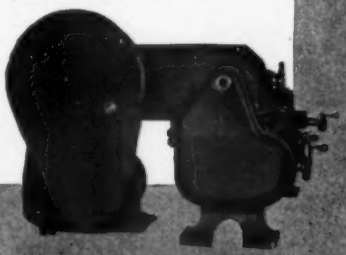
- 12 Spindle Speeds, 30 to 1450 R.P.M.

**Patented Unit Counter Assembly**

The countershaft assembly shown at the right is carried on a three point suspension and completely insulated by rubber at all contact points to prevent vibration being transmitted to the Lathe. All pulleys and belts are completely guarded, yet readily accessible when desired.



## LOGAN ENGINEERING CO., CHICAGO, ILLINOIS

in recent months. It is made of aluminum alloy and complete with a 13" long beam, weighs but two ounces. The design is a radical departure from the conventional small beam compass, in that clamping nuts or screws are absent in its construction. The beam is of I-beam construction, 5/32" thick in the body and flaring out top and bottom to approximately 7/32". Height of the beam is about 29/64". On the top side of the upper flared member is a rack, which in reality is a straight knurl of 1/32" pitch, the teeth being set at 45° to the longitudinal axis of the I-beam section. The pencil chuck slide and the needle point slide are broached for a sliding fit on the beam. The upper surfaces of both slides are milled out to accommodate thumb rollers, by which the slides are manipulated and adjusted. A steel pin, protruding either side of these rollers rides in retainer slots milled into the slides. The outer peripheries of these rollers, one to a slide, are knurled at a 45° spiral angle and conform to the shape of knurl on the beam. A formed music wire spring loops over the thumb roller wheel in such a manner as to maintain constant engagement, under pressure, between roller and beam.

Positioning of both slides is accomplished by rotating the slide rollers with the thumb, the action being much like a gear pinion engaging a rack. The same principle is used here as that of a helical gear, in that several teeth are constantly in mesh. Thereby it is impossible to get a jerky movement or loose adjustment. If it is desired to make quick adjustment from one extreme diameter circle to the other the beam need only be grasped in one hand and the slide pulled along the beam with the other. Of course, the thumb roller will rotate rapidly during this procedure. Approaching the re-

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HYDRAULIC DUPLICATING UNIT

Model A HC Eklind Turchan Duplicating Attachment is designed and priced for die shops making Bakelite, Plastics, Rubber and Drop Forge molds and dies. Will handle average work efficiently, economically and speedily. Oil pressure controlled by tracer, feeds spindle and tracing arm to follow model accurately. Die capacity is 16" long by width depending on cross feed of machine. Capacity can be increased by [illegible] feed on side of overarm.

Model A H Eklind Universal high speed Milling, Drilling and Boring unit is a most valuable tool room aid. Can be had separately and the duplicating attachment added later.

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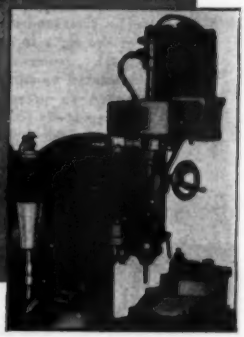

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*announces*

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**A NEW, 3 plunger, vertical, high pressure pump for practically any pressure medium has been added to the long list of Elmes pumps.**

**It offers new quietness, new ruggedness, new advantages, and new performance made possible by the latest engineering design and construction. For example, ball and roller bearings throughout, self-lubricating, forged steel body and crank shaft, adjustable glands, maximum capacity 75 gallons per minute, working pressure up to 6,000 pounds per square inch. Larger pumps available. Send for details.**

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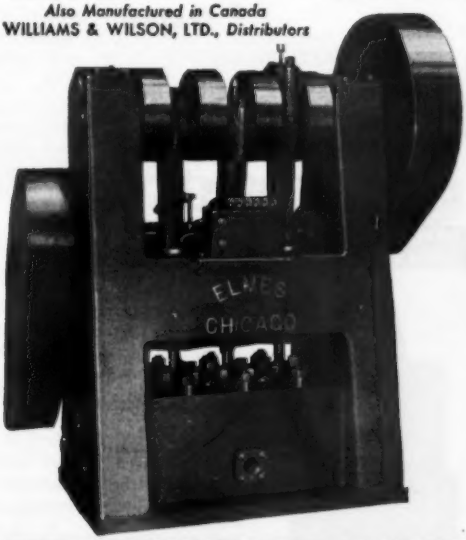


**ELMES**

quired setting of the needle point and pencil slides, the rollers are rotated by pulling the thumb under pressure over the wheel. When the desired setting is reached and the thumb is removed, friction between roller and beam created by the formed wire spring is sufficient to hold the points rigidly in place without movement. In this manner of positioning, it was possible to eliminate the locking nuts and screws usually found in such small beam compasses.

In other types of pencil lead chucks, many a designer can relate how at times he must remove a piece of lead by actually reaming the lead out of the chuck by the pulverizing method. This is a tedious and exasperating job and wastes time. In this particular beam compass, this fault is overcome by the use of a lead expeller. The pencil slide has a threaded stem accommodating a knurled nut. The end of this nut is spun over a small wire holder that has a short wire protruding into the hollow stem above the chuck. This wire holder can rotate in the nut, and does, as the expeller wire rides in a slot in the pencil slide stem. The chuck is intended to hold the pencil firmly but not tightly.

The aluminum has an anodized or hard finish. Beams up to 50" long are obtainable. Because of the absence of lock nuts and screws, this beam compass has but 5/16" thickness and lies flat on the drawing board when not in use.

One objection can be found to the needle point holder. The stem is of the split type and holds the pin by friction only. This pin must be assembled and removed with pliers. The suggestion has been made that pencil lead type of chuck be supplied to hold the needle point.

It can be seen from the preceding discussion that the designing engineer and draftsman not only require, but demand instruments having the following qualities:—

1. Accurately made and correctly aligned.
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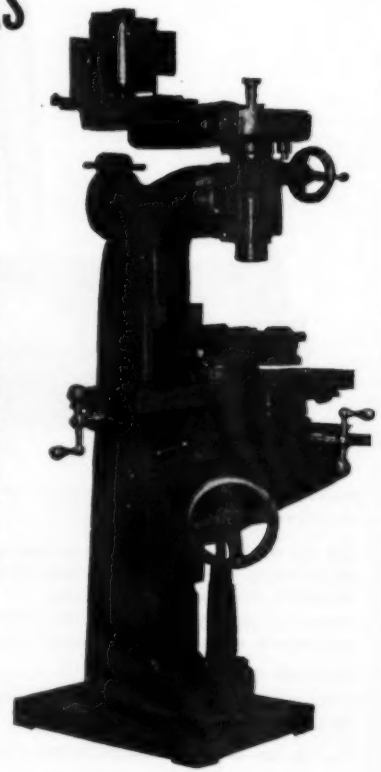

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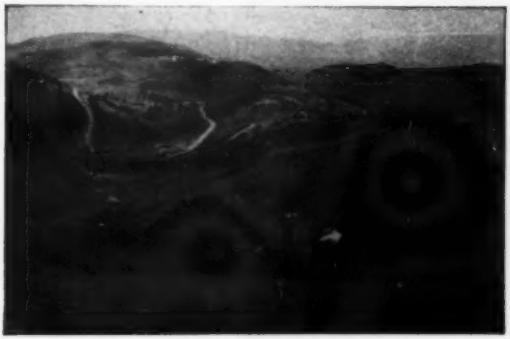
# Mechanical and Structural Parts Fabricated by Arc Welding

By WALLACE WHITE

KNOWLEDGE of welding engineering, applied in fabrication of miscellaneous mechanical and structural equipment, has been used to advantage by the Cresson Consolidated Gold Mining and Milling Co. in its operations near Cripple Creek, Colorado (see Fig. 1).

Examples of the work done with welding by this gold mining company under direction of Guy Rorabaugh, master mechanic, are shown in the accompanying illustrations supplied by The Lincoln Electric Company, Cleveland, Ohio. Many of the principles and methods involved may be readily adapted to other industrial applications.

Shown in Figs. 2, 3, 4 and 5 is all-welded ore house at Empire Mine. This ore house is 80 feet high and 50 feet



Figures 1 (left) and 2 (above) — showing general view of Cripple Creek gold mining district and trestles and ore bin at Empire Mine.

wide by 28 feet deep. It is built from scrap iron plate, I-beams and channels. Main columns are 15" I-beams, spaced 12 feet apart with 8" I-beams for braces, longitudinally and diagonally. Cross members are 12" I-beams. Hoppers have 8" I-beam ribs spaced 2 feet apart. Plate is ¼". Capacity of this ore house is 500 tons. It was built in February 1941 during extremely cold weather. Conventional construction of

ore houses is wood. This steel construction makes it fire-proof. It was built by two welders in two month's time—less than would have been required for wood construction. To obtain fire-proof construction with riveting would have cost about 35% more than for welding, it is estimated.

Mine cars running from the head frame across the trestle, shown in Fig. 2, dump the ore into the bin. From here it empties into picking tables and the worthless tailings are removed

Figures 3 (top), 4 (center) and 5 (bottom left) showing ore house, ore picking floor and welded framework of hopper.

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while the good ore is passed on into a chute which carries it to railroad cars underneath the ore house.

Fig. 3 shows the ore house with Pike's Peak in the clouds in the distance. This is on the western side of Pike's Peak—elevation about 10,000 feet.

In Fig. 5 is a view looking up from the railroad track showing the hopper construction. The old rivet holes in the plates and I-beams may be observed. The plating is lapped over the rivet holes to give dust-proof construction.

Fig. 4 was taken from the ore picking floor where the ore is hand-picked. Mr. Rorabaugh is showing Mr. Rees, representative of The Lincoln Electric Co., construction of the large hopper.

Fig. 8 is a view in the hoist room of the head frame. The hoist gear bearing on the left is of cast construction and was purchased with the hoist equipment some years ago. When this hoist was installed, only one of the cast bearings was available. Mr. Rorabaugh designed and built another one, shown on the right, using welded steel. The

Figures 6 (top), showing all-welded steel mine car; 7 (center) all-welded gear case and 8 (right) in hoist room of head frame.

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Fig. 9 (right) all-welded snow plow; 10 (center) center view of plow and 11 (bottom right) boom for tractor built of 6" channels and flame-cut plate.

main pedestal is built from 1" plate with beveled butt joints. The bearing proper is built from 6" tubing with 1" wall section, split in half and welded to 1" plate. The top of the bearing is reinforced with flame-cut 3/8" plate as shown.

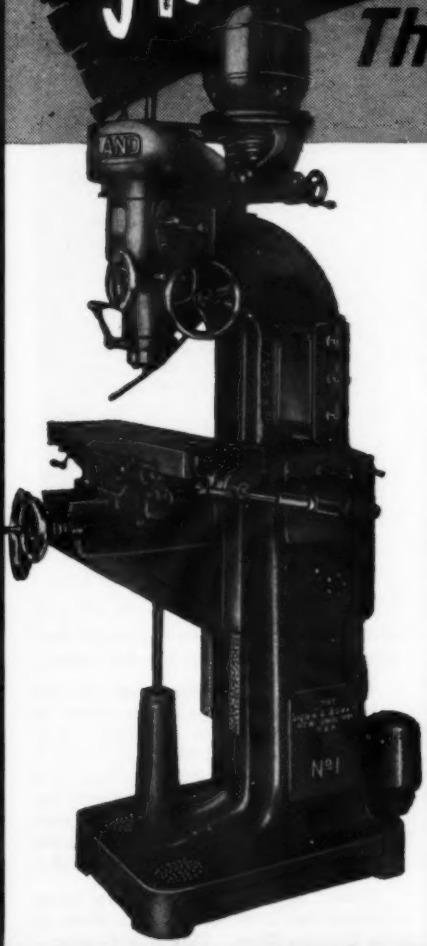
An all-welded steel mine car is shown in Fig. 6. This shows an interesting use of extension plates to increase the height of the sides so that the car will hold a greater amount of ore. These extensions are made from flame-cut plate and bar stock as shown.

Fig. 7 shows an all-welded gear case, built from flame-cut 1/8" plate. Diameter of housing is 7 feet.

Figs. 9 and 10 show a snowplow built by the Cresson Mine welding department. Plate is 1/4". Note plate stiffeners at bottom. Also, 6" angles running longitudinally. The scraper blade on front of the plow is of high carbon steel plate, bolted on. It is

# Introducing

## The CLEVELAND NO. 1

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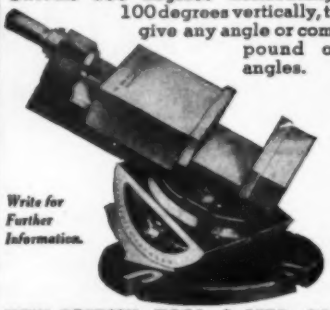

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readily renewable. The boom shown in Fig. 11 ties into the sheave wheel in center of the plow and keeps the nose and scraper blades at any desired height. Box beams which connect plow to the pulling tractor are built from 6" angles. This plow is used extensively during the winter months in removing snow from the narrow mountain roads over which workmen must travel to and from work, and over which supplies must be brought into the mine.

Figure 12—An all-welded pipe line which carries water to the Cresson Mine. This is a 4" pipe. This is but one of many such lines.

The arms beyond the bend are box sections in the tractor boom shown in Fig. 11, made from channels with flanges welded to them. This boom is used for a lot of construction work around the mine—also in conjunction with the snowplow shown in Fig. 9. It fits onto the rear end of the "cat", whereas the snowplow hooks onto the front end.

Shown in Fig. 12 is one of the many welded pipe lines which carry water to the Cresson Mine. This is a 4" pipe.

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# "Let's Talk Shop!"

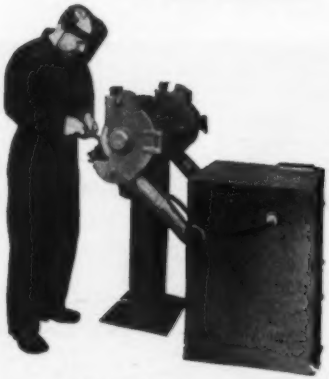
## Serial Operations on Bending Press

NECESSITY in war requirements has stimulated the use of available tools, sometimes with surprising economy. The accompanying illustrations show how a manufacturer met a production problem when his raw materials for zinc castings were cut off. Not so readily shown in the picture, is the fact that the new method proved a considerable economy. The small sheet steel box was designed, dies and machinery made and in operation within 60 days. The manufacturer could not get draw steel, and the stock he had available had a rather wide commercial variation in gauge thickness.

The bending press shown in the picture is a Model B-6 Sturdybender, manufactured by Cyril Bath & Co., Cleveland, Ohio, who likewise furnished the design and dies to complete the job. The first operation was to blank and pierce the piece—the second, to emboss the forward face of the box and turn up the flanges. Three more progressive steps completed the piece, together with protrusions for welding on the side walls of the box, which was the final operation. Safety devices were later fitted to the press, which with one operator produced 35 or 40 boxes per hour in tryout.

The advantages claimed for this set-up are:—first, it avoided the need of special drawing steel,—second, the box was completed in the hands of the operator without being put down or conveyed to another press, with a marked saving in handling time. Third, the floor space requirements

# Solving Your *Dust* Problems



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were less than if the job had been done on a number of separate tools, and fourth, the cost of operating one press with a 5 h. p. motor is materially lower than if the work were done on a series of presses with individual mechanisms all requiring attention. A fifth advantage from the manufacturer's standpoint was that the dies for this process were less costly than draw dies, and that the bending press itself is a type of tool having a wide usefulness for other types of work, should the existing need cease.

## Emery Wheels

By Ernest W. Fair

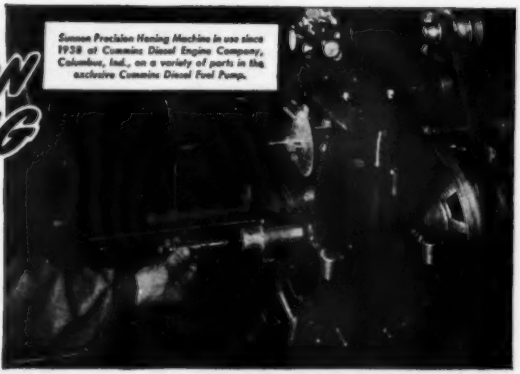
Longer life from emery wheels in the machine shop can always be obtained by their proper care and intelligent use in actual operation. For some reason, the average mechanic is more careless of these wheels than any other tool in the shop. They are expensive and one of the surest ways to keep down shop costs is to prolong their life. Proper use also means better work and less chance of work spoilage.

Before attempting to grind a piece of metal on the wheel one should always make sure that the rest is as close to the face of the wheel as possible without touching it. This adustment should be made while wheel is running. After being placed in correct position, the rest should be clamped down by means of the bolts at each end.

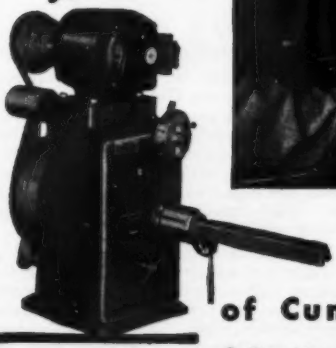
Bearing down with excessive pressure on the piece being ground will cause the metal to be heated very quickly with the possibility of drawing the temper. The reason wheels need truing up so often is because of the tendency of some mechanics to press against them as hard as they can. This causes the hard grains to loosen and be thrown out, leaving the softer material, which soon wears down.

When a piece of metal or a tool is being ground, it should not be held in one place on the face of the wheel but should be moved back and forth constantly. The former practice means a groove cut in one spot in the face of the wheel.

# SUNNEN PRECISION HONING



*Sunnen Precision Honing Machine in use since 1938 at Cummins Diesel Engine Company, Columbus, Ind., on a variety of parts in the exclusive Cummins Diesel Fuel Pump.*



## Contributes to the Fuel Pump Accuracy of Cummins Diesel Engines

● The picture above shows the Sunnen Precision Honing Machine finishing fuel pump barrel for the metering plunger. The plunger diameter is held to a tolerance of .0002".

Here's another example of how Sunnen Honing is serving manufacturers—especially those holding important defense contracts.

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Drawing and Blanking Die "Saves time in producing smooth base metal finish."

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1. Corrects errors of out-of-round and taper produced by previous operation.
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4. Maintains alignment already established by previous operations.
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*Wide Range of Uses*—The Sunnen Model "MA" Four Speed Precision Honing Machine will handle any size hole from .185" to 2.400" in diameter in any metal except lead or babbitt.

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In the column on the left we show a few typical jobs handled on the "MA."

Write for the new 8-page bulletin giving complete information—or if you prefer, a Sunnen Sales Engineer will call and demonstrate the Sunnen Precision Honing Machine in your plant on your job. Write today.

**SUNNEN PRODUCTS CO.** SUNNEN 7935 Manchester Ave., St. Louis, Mo.; Canadian Factory: Chatham, Ontario.

If proper care is not used when grinding, chips will sometimes stick to the wheel itself, becoming embedded in the grain to such an extent that the face of the wheel becomes smooth or glazed. When a hand dresser is being used, the tool rest must always be adjusted to suit the dresser.

Grinders should always be kept clean and well oiled. Also the oil needs to be renewed occasionally. It is of the utmost importance that the bearings be kept oiled, because the wheel runs at high speed and the journals will quickly burn out if they are not well lubricated.

On some older types, bearings are oiled by hand through a small drill hole in the tops of the bearings. In such cases it is wise to oil lightly each time wheel is used.

It is always advisable to remember also that if anything happens to the wheel it will break and fly apart. If one of the flying pieces strikes an operator on the head or over the heart, serious injury may result.

Modern shops require operators to use safety goggles while grinding and a pair should always be in place beside the shop wheel for flying chips may easily cause the loss of an eye.

Many operators have also been injured by getting their hands or fingers on the wheel itself. If this happens, immediate medical treatment should follow.

## Welding Students Build Tester

Keen competitive interest is shown by students at the Hobart Trade School, as their weld pieces are tested in the bend test machine pictured. Since most employers demand the bend test in their qualifying examinations, students are eager to pass this test so that they may aproach their future employer with confidence.

This test machine was constructed at a slight cost by students enrolled in the Hobart school. The sides are made from two ½"x18"x60" plates. Plates are notched 20" from the bottom. Notch was made 5" inward and 25"


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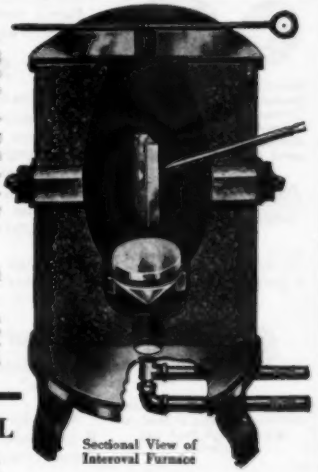

Sectional View of Interoval Furnace

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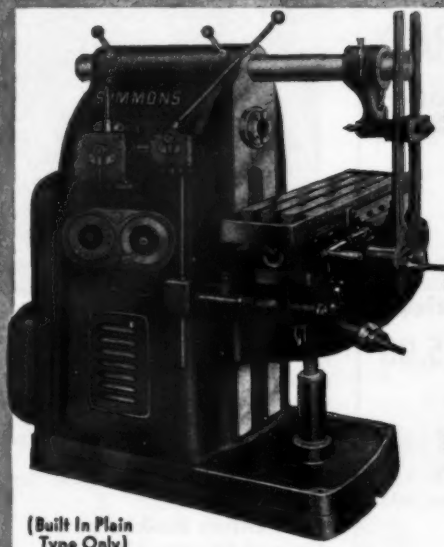


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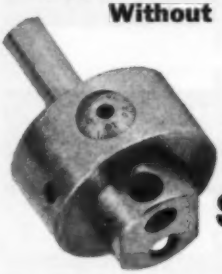

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**Complete with 2 boring bars (one straight, one angular), wrenches and case.**

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high. Notch was boxed with ½" plates. Side plates are held apart at the top and bottom. The top front of the machine was covered with ⅛" steel for appearance.

A regular U. S. Navy bend die is used for the test. Test is operated by a five ton hydraulic jack. Top die is held in place by angle iron slides so that die may be removed. Bottom die is held in place by a simple piece of pipe fitted to head of jack and welded to bottom of die.

(Photo-Courtesy Hobart Bros. Co., Troy, O.)

### Smit Offers Booklet on Care of Diamond Tools

A helpful booklet, "The Care and Maintenance of Diamond Tools," is announced by J. K. Smit & Sons, Inc., 157 Chambers St., New York. This useful manual was written for the express purpose of helping shop men in dressing and truing grinding wheels with diamond tools.

Subjects outlined include tool mountings, correct angle with the wheel, chatter marks, coolant suggestions, and avoiding taper. Approaching the wheel, depth and speed of dressing, and turn-

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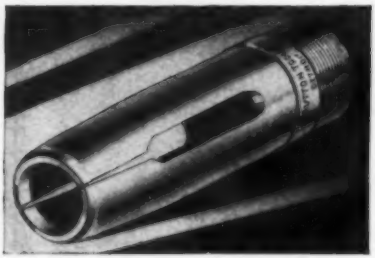

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**with long-life spring tension**

***and*** **Sutton Master-Feeders with interchangeable and replaceable pads**

***and*** **Sutton Style L Master Feeder—Holds Pads without pins or screws**

● **Sutton DIAMOND-GRIP Collets are perfect partners for Sutton Feeders. Ask for complete Sutton Catalog.**

**SUTTON TOOL COMPANY**

**2895 W. Grand Blvd., Detroit, Mich.**

*Accessories for Screw Machines*

ing the diamond are also discussed. This booklet is of a very practical nature, as this outline indicates.

## Tooling Turret Lathes for Small Lots

McKenna Metals Co. announces an interesting and helpful folder on "Tooling Turret Lathes for Small Lot Production with Kennametal Steel-Cutting Carbide Tools." It describes and illustrates tool set-ups which are adaptable to a wide variety of turning and facing operations.

The standardized Kennametal boring tools available are also discussed and a few suggestions made as to setting them up.

This folder may be obtained from McKenna Metals Co., 135 Lloyd Ave., Latrobe, Pa.

## Carbide Tool Manual

Gathered together in a single working manual and just published by Carboloy is instructional material covering virtually every conceivable factor connected with the use of tungsten carbide tools, much of it previously unpublished.

Primary purpose of the manual (GT-133) is to assist defense industry. As the result of current pressure for increased defense production, more and more companies have been turning to carbide tools, while thousands of operators now being employed by industry are being put to work with carbide tools for the first time.

It is to meet these conditions - to speed the instruction of new operators, to facilitate the design, brazing, use and maintenance of carbide tools by new organizations, that the manual has been prepared.

Not only does it cover the design of carbide tools themselves—the selection of tool shapes, tip and shank sizes, relief angles, etc. - but it also covers such related items as design and setting of tool holders, machine recommendations, tool holder screws, correct methods of using coolants, etc.

For manufacturers desirous of producing their own tools, the manual provides complete instructions on torch brazing technique, materials, and equipment.

for Accurate Lapping
of Delicate Joints

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*Semi-Steel* LAPPING PLATE

● This plate is specifically designed to assure a perfect fit when lapping in metal joints on which no gaskets, shellac or other sealer is used. It has 1/16" grooves, spaced 1/2" apart, running the full length and width of the dependably accurate surface. Made of the finest semi-steel, specially heat treated and carefully machined. Sizes from 8x8 to 52x144 inches. Arc-welded, all-steel stand is optional.

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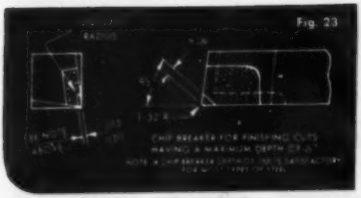
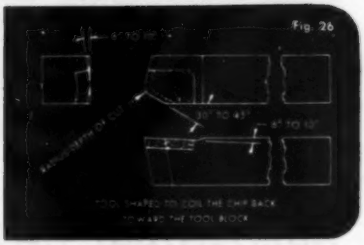


Fig. 24
CHIP BREAKER FOR CUTS EXTENDING TO SHOULDER OR WHERE IT IS DESIRED TO FORCE THE CHIP AGAINST THE WORK AND CAUSE IT TO BREAK




## RECOMMENDED WIDTH OF CHIP BREAKER (W) (See Fig. 21)

| DEPTH OF CUT (Inches) | FEED-In. Per Rev. | | | | |
|---|---|---|---|---|---|
| | .008-.012 | .013-.017 | .018-.022 | .023-.027 | .028-.032 |
| | WIDTH OF CHIP BREAKER | | | | |
| 1/64 - 3/64 | 1/16 | 5/64 | 3/32 | 7/64 | 1/8 |
| 1/16 - 1/4 | 3/32 | 1/8 | 5/32 | 11/64 | 3/16 |
| 5/16 - 1/2 | 1/8 | 5/32 | 3/16 | 13/64 | 7/32 |
| 9/16 - 3/4 | 5/32 | 3/16 | 7/32 | 15/64 | 1/4 |

**NOTE:** A chip breaker depth of .020 is satisfactory for most types of steel.

There are complete charts of recommended feeds, speeds, tool angles and depth of cut, for various materials—steel, ferrous castings, non-ferrous and non-metallic.

For the tool room there are complete instructions for grinding tools, including recommendations as to machines, wheels, grinding technique and the design and grinding of chip breakers for tools used in steel-cutting.

Designed to simplify the carrying of tool stocks and enable faster deliveries of materals the manual contains examples of how special tools can be produced from "standard" tools by simple grinding operations.

A summary of various grades of carbides is included to assist Tool Engineers in selecting the proper grades for different jobs.

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# OR
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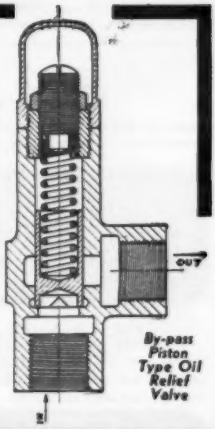


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**Specialties Co., Inc.**

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## RECOMMENDED DESIGNS FOR BRAZING ENCLOSED TIPS

**SUGGESTED METHODS** to overcome braze strains caused by difference in rate of contraction between Carboloy and steel while cooling.

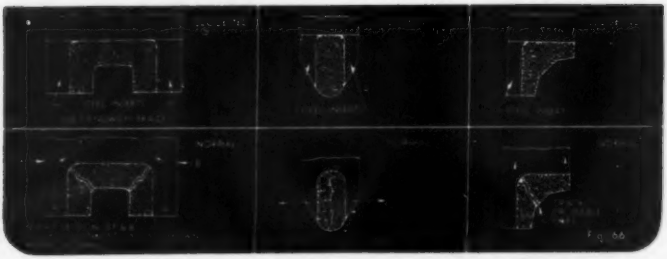

Fig. 66

# TO GET GOOD FINISH FAST—USE DOUBLE ANGLES

When rough grinding, ALWAYS grind side secondary relief angles 3° to 5° greater than relief angle desired. By doing this you avoid grinding on the steel shank when finish grinding. Steel loads the wheel rapidly—prevents you from obtaining the best possible cutting edge. Example: To get relief angle of 7°—rough grind tool at 10° (Fig. 50)—leave a small land—about 1/32" at cutting edge. After rough grinding at this larger angle finish tool by grinding at 7° on tip only (Fig. 51). This enables you to produce best possible cutting edge with finish grind.

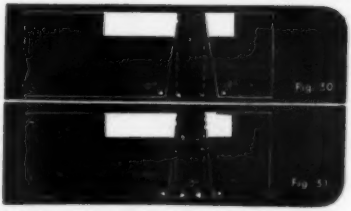

Fig. 50

Fig. 51

# HOW TO USE DISC WHEELS FOR ROUGHING

Dress 1/16" crown on 60 grit disc wheel (Fig. 55). This reduces area of contact and permits rapid stock removal without excessive heat. Grind top and side relief across outer edge of wheel (Fig. 56) and front relief across inner edge (Fig. 57).

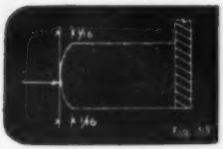

Fig. 55

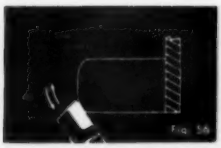

Fig. 56

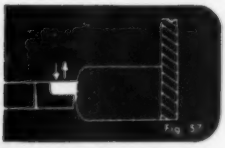

Fig. 57

# HOW TO DRESS WHEELS FOR RAPID STOCK REMOVAL

Correct dressing of wheels is important in safely obtaining rapid stock removal. Method shown enables you to keep area of contact against tool at a MINIMUM—avoiding generation of excessive localized heat—an absolute essential when grinding safely and rapidly.

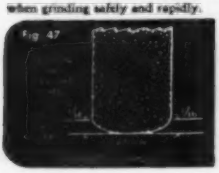

Fig. 47

Fig. 48

Fig. 49

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In addition to a valuable list of 'Do's and Dont's' for carbide tools, there are provided sketches of handling equipment found valuable in preventing accidental damage to such tools.

The manual even contains suggestions as to the setting up of tool control and handling methods in the shop with illustrations of tool record cards, etc., based on a survey of best current practice in this respect.

Two specimen pages from this very complete manual are reproduced, courtesy Carboloy Co., Inc., 11139 E. 8-Mile Road, Detroit, Mich. from whom copies of the manual may be obtained.

## Job Applications

By M. G. Heuer

A new system of handling applications for shop workers at Kearney & Trecker Corp., Milwaukee, Wis., is reported to have cut labor turn-over down to less than one percent since it was installed in September 1940. It has also helped to keep the plant free from any form of sabotage during the rush of defense work.

Applications in the employment managers' office are classified according to departments for which the applicants are qualified, rather than in straight alphabetical order. This arrangement helps the employment manager to know at all times exactly how many applicants are available for each department. If the applicant has sufficient experience, his application is specially marked. "Preferred."

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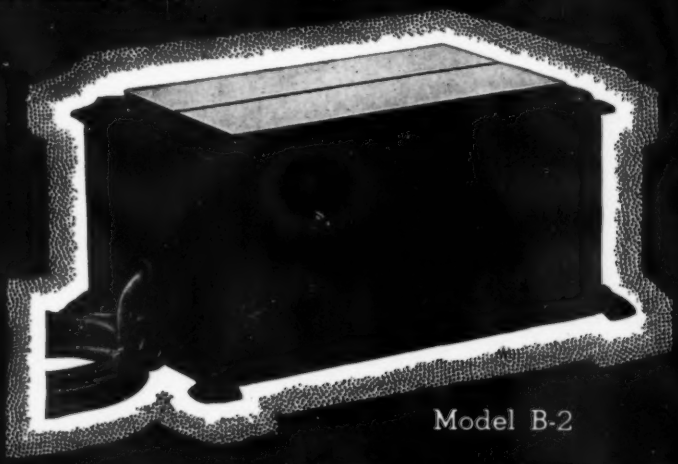

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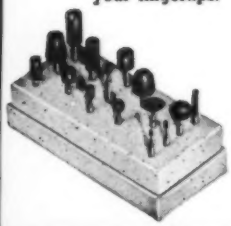

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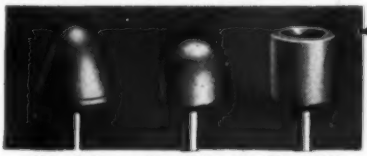

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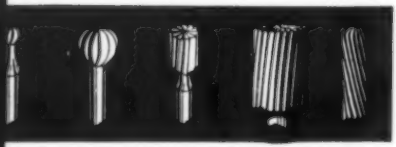

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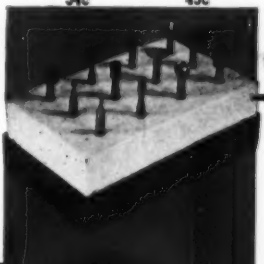

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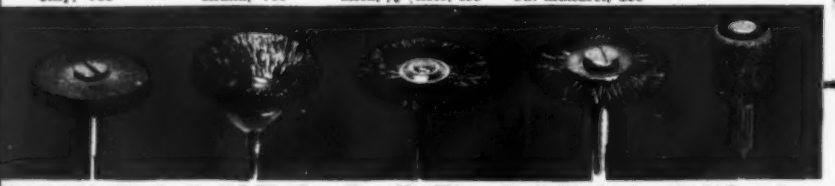

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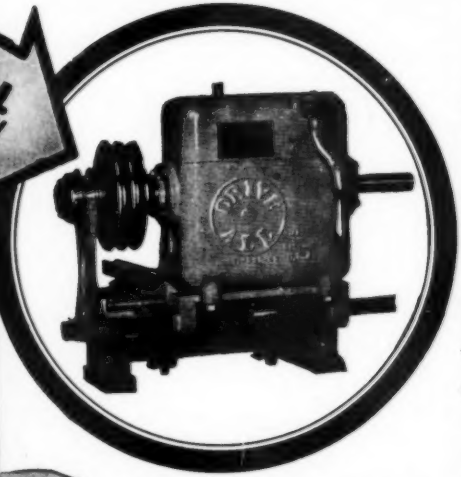

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## Safer Milling

By Ernest W. Fair

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2—Hand injuries on the cutters may occur when fingers are caught between the cutter and the work while the machine is running or by striking the hand or arm against the cutter while setting up the work. Keep hands away from the cutter while it is running.

3—Machine damage will nearly always result when feeding the knee too far up or down.

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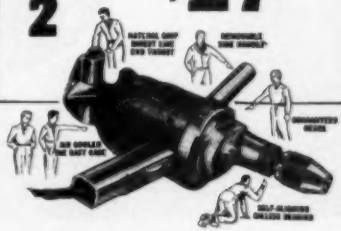

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on your
**CARBIDE TOOL Requirements**

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**The Carbide Tool Engineering Company**
**333 N. Michigan Ave., Chicago, Ill.**

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**ARBOR PRESSES**

12 sizes ¾—to 10 tons. Bench and Floor Models, Simple or Compound Leverage. Alloy steel rack and Gear.

**Milling Machine Drill Press and Shaper**

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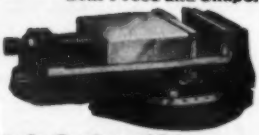
Plain or Swivel—5 types.



*Write for Catalog and Prices.*
*Dealers: Some Choice Territories still open*
**SHELDON MACHINE CO.**
**4242 N. Knox Ave., Chicago, Ill.**


4—Feeding the saddle against the column or out too far is another frequent cause of accidents.

5—When chips are to be removed from the danger side of the cutter, the machine should be stopped to do it.

6—Never reverse machine while it is running; that frequently brings trouble.

7—If work is moved as far away as possible while clamping, the operator can avoid striking his hands on cutters while setting up.

8—Don't change speeds or feeds while machine is running; it pays to stop for a change.

9—Use only wrenches that fit the nuts or bolt heads; never use a "half-fit" wrench.

10—A cutter slipping on arbor will often cause serious damage; watch this point continuously.

11—When you receive a cut, have it treated immediately; don't risk infection.

12—Many accidents are caused by the operator's failure to clamp the work properly; care eliminates this cause.

13—Make sure clamps or bolts are not so high they cannot clear under the arbor before starting the machine.

14—Work with a clean machine, getting brush or other articles caught between cutter and the work has caused many a serious accident.

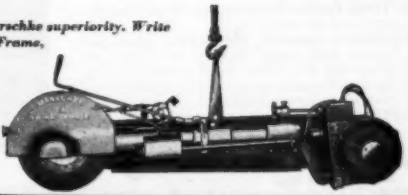
15—One of the surest ways to cause an expensive breakdown is to operate the machine with improper lubrication. The operator should always make certain that every part of the machine is well and properly oiled before beginning his work.

# 3 SPEEDS

**Contribute to Marschke Swing Frame Grinder Efficiency**

**Marschke A. C. Swing Frame Grinders have speed control—3 speeds—developing correct s. f. p. m. during each third of wheel life ● ● Marschke D. C. Swing Frame Grinders give *constant* cutting speed ● ● Speed control, added to Marschkes' vibrationless wheel rotation and easy handling, results in steady wheel contact and maximum cutting. Operators can rely on Marschkes for more production. You can expect less wheel and machine expense than with any other swing frame grinder.**

***Look into the 18 features accounting for Marschke superiority. Write for full information about Marschke Swing Frame, Floor Stand and Pedestal Grinders.***



## THE MARSCHKE LINE

**VONNEGUT MOULDER CORP.**

**1885 Madison Ave., Indianapolis, Ind.**

# RITCO

## DIE SINKING *and* DROP FORGINGS

Special shapes produced to customers' requirements in carbon, alloy, and stainless steels . . also in non-ferrous metals. Standard eye bolts and engineers' wrenches carried in stock.

*We also offer facilities for*

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**BOLTS, NUTS *and* STUDS**
**HEAT TREATING**

**Estimates gladly submitted.**
**Send samples or blueprints.**

***Catalog on request.***

## RHODE ISLAND TOOL CO.

148 West River St., Providence, Rhode Island

*Serving American Industry Since 1834*

# CALL 'EM *RIGHT!*

*If you find it difficult to describe a tap correctly, or if you are in any doubt about the exact meaning of certain terms, the definitions on this page may help you. Keep it for handy reference.*

**AXIS OF TAP:** The longitudinal central line through the tap.

**BODY:** The threaded and fluted part of tap.

**CHAMFER:** The tapered outside diameter at the front end of the threaded section.

**CUTTING FACE:** The front part of the threaded section of the lands.

**EXTERNAL (MALE) CENTER:** Sometimes termed "male center." It is the cone shaped end of the tap. It is found only on small taps and is for manufacturing purposes. It is usually found only at the threaded end.

**FLUTE:** The groove providing for the cutting faces of the threads or teeth, for chip passage and for lubrication.

**HEEL:** The back part of the threaded section of the land.

**HOOK:** The curved undercut of the cutting face of the land.

**INTERNAL (FEMALE) CENTER:** Sometimes termed "female" center. It is the small drilled and countersunk hole at the ends of the tap, necessary for manufacturing purposes.

**LAND:** The threaded web between the flutes.

**POINT DIAMETER:** The outside diameter at the front end of the chamfered portion.

**RADIAL:** The straight cutting face of a land which, if continued, would pass through the center of the tap.

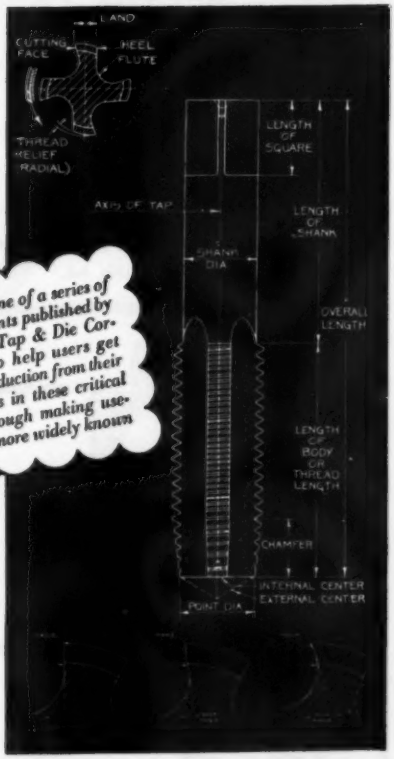
**RAKE:** The angle of the cutting face of the land in relation to a straight line from the point of the cutting face to the axis.

**SHANK:** The part behind threaded and fluted section of tap.

**SQUARE:** The squared end of the tap shank.

**THREAD:** The cutting tooth of the tap which produces the thread.

**THREAD RELIEF (RADIAL):** A clearance providing a gradual decline in the major, pitch and minor diameters of the lands, back of the cutting face. This style of relief is applied only to certain sizes and types of taps.




*This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known*

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

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Greenfield, Massachusetts
Detroit Plant: 2102 West Fort St.
Warehouses in New York, Chicago and Los Angeles
In Canada:
Greenfield Tap and Die Corp. of Canada Ltd., Galt, Ont.

# What's New in the Industry

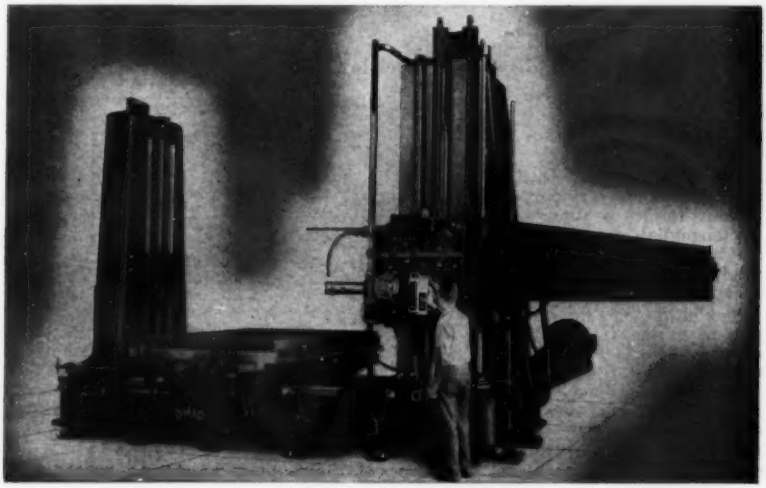
## A Larger Dreadnaught Boring Mill

A larger Dreadnaught Horizontal Boring, Drilling and Milling Machine is now available with the following maximum specifications:—72" x 132" table, 60" wide bed, from 10' to 20' between face plate and bar support, 96" vertical travel of spindle head and 72" continuous spindle feed.

Anti - friction bearings are used throughout. Built-in electrical power rapid traverse with push button control is provided. Narrow guide construction is used for all moving units. Push button control is employed for start-stop, forward-reverse and run-jog of the spindle. Automatic lubrication features pressure lubrication to all sliding surfaces. Unit construction provides accessibility to all units. Multiple splined shafts with splines milled from the solid for all sliding gears and clutches are used. All mechanical clutches are of the internal gear tooth type.

The box-shaped, counterbalanced spindle head carries the speed and feed transmission, the loads from spindle and gearing being transferred to the column face. All feed and speed changes are grouped so operator need not move from his normal position. A multiple - disc, magnetic type drive clutch gives complete spindle control through a portable push-button unit. The ratio between low and high speeds is 1 to 190 with maximum speed of 600 r. p. m.

Chrome nickel alloy steel feed and spindle speed gears, heat-treated and hardened; high tensile, alloy steel cast spindle driving sleeve with nitralloy bushings; nitralloy forged spindle, heat - treated and hardened; husky alloy steel shafting heat-treated and



ground; are typical of the materials used.

This machine is available also in a floor type with corresponding characteristics and a wide range of specifications to meet requirements. Manufacturers are The Ohio Machine Tool Co., Kenton, Ohio.

## No. 2 American Plain Milling Machine

The name and manufacturing rights to the American Milling Machine have been acquired by J. L. Lucas & Son, Inc., Bridgeport, Conn., it is announced. The No. 2 machine is described as a new model redesigned to meet modern milling requirements.

This plain miller features an infinite number of spindle speeds between 25 and 500 r. p. m. with standardized spindle nose. A U. S. Vari-Drive a. c. motor is mounted in the base. It drives the spindle by means of a multiple V-belt and a Twin-Disc clutch.

All controls are located centrally for ease of operation—speed and feed changes, push button control, and clutch lever. The table is 46" x10½" with three T-slots. Table has both power longitudinal and power transverse feeds.

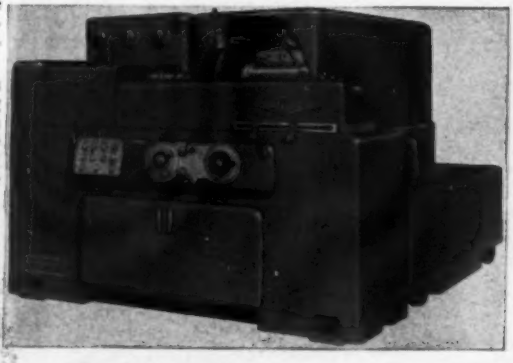
The new American milling machine is fully described in an attractive new folder.

## The Landis No. 6 Precision Thread Grinder

The Landis Machine Co., Waynesboro, Pa., announces a new No. 6 Precision Thread Grinder.

This new machine was developed for grinding various forms of threads on tangential chasers for die heads and for radial and circular chasers for collapsible taps.

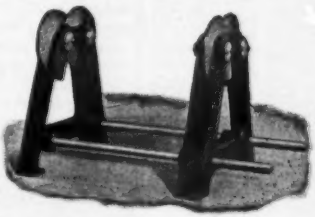
Flexibility of application to various work diameters, lengths, and thread pitches has been made more convenient. Both work and wheel speeds are practically infinite throughout the full range. This permits unusual accuracy of finish and maximum production.



## It's a laugh to think we could get along without *ANDERSON BALANCING WAYS*

That's what you'll think, too, after installing this time and labor saving equipment. Any shop handling rotating parts can profit by using this simple, sturdy and thoroughly dependable device for balancing, straightening and truing operations.

| Swing | Greatest Distance Between Standards | Capacity in lbs. |
|---|---|---|
| 20 in. | 20 in. | 1,000 |
| 40 in. | 30 in. | 2,000 |
| 60 in. | 30 in. | 2,000 |
| 72 in. | 66 in. | 5,000 |
| 96 in. | 88 in. | 10,000 |



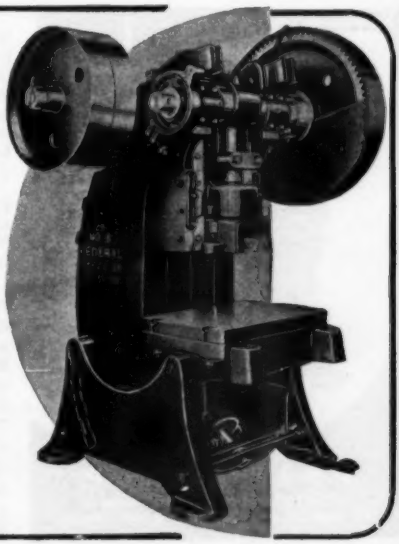
Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a quick, accurate indication of whether or not the work is in perfect balance.

**ANDERSON BROS. MFG. CO.,** 1907 KISHWAUKEE ST., ROCKFORD, ILL.

## FEDERAL PRESSES for "FEDERAL" JOBS

If your plant is called upon to assist in the rearmament program, you need top notch machinery. Federal Presses are now being used throughout the country on government orders. They are proving their worth on every job. Let them help you in obtaining "peak" production at minimum cost.

*Write for full details and information.*



**FEDERAL PRESS CO.**

**ELKHART, - INDIANA**

Winter
TAPS & DIES
Manufacturers of Hand, Machine Screw, Chip Driver, Pipe, Nut, Stove Bolt, Boiler, Pulley, Staybolt, Tapper Taps, Serial Sets, Interrupted Thread, High Speed and Alloy Steel Taps Ground Thread Taps.
Also a complete line of Round Adjustable Dies.
THE WINTER BROTHERS COMPANY
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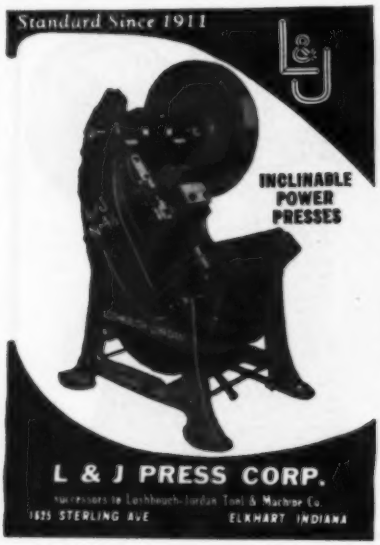
A DIVISION OF THE NATIONAL TWIST DRILL & TOOL CO., DETROIT, MICH.





Set-up changes can be made more easily and quickly.

The machine is suitable for grinding right and left hand external threads from 2 to 80 threads per inch, up to 6" diameter—12" thread length on work having a maximum center distance of 24". Single or multiple National Standard, "V", Whitworth, Acme, modified buttress, and worm threads having a maximum helix angle of 15° may be ground. Studs, screws, and other parts which do not have centers may be ground with the use of a collet type chuck or special work adapter. Standard chucks of different types may be employed without using an intermediate flange or adapter.

Simplified change gear box construction with a minimum number of gears allows a greater number of both English and metric pitches to be obtained.

Work table and wheel slide of the grinder operate on accurately scraped surfaces on bed of machine and maintain a constant length of bearing at all times.

Leadscrew which provides positive feed for work table is mounted on antifriction bearings. It is located centrally between ways to assume thrust load without binding or forcing work table out of alignment. The leadscrew has an automatic device to compensate for backlash between the change gears.

Wheel head, which incorporates grinding wheel spindle, is comparatively large and is cast in one piece. Wheel spindle is mounted on four ultra- precision preloaded ball bearings.

Truing device for grinding wheel is fully automatic in its function. Several different types of truing devices are available for the different forms of thread grinding, and all are interchangeable on driving unit. The truing cycle provides a simple and accurate means for maintaining thread size.

All rotating shafts and all sliding surfaces are shielded from dust and grit. Electrical switches are centralized at front of machine for convenience.

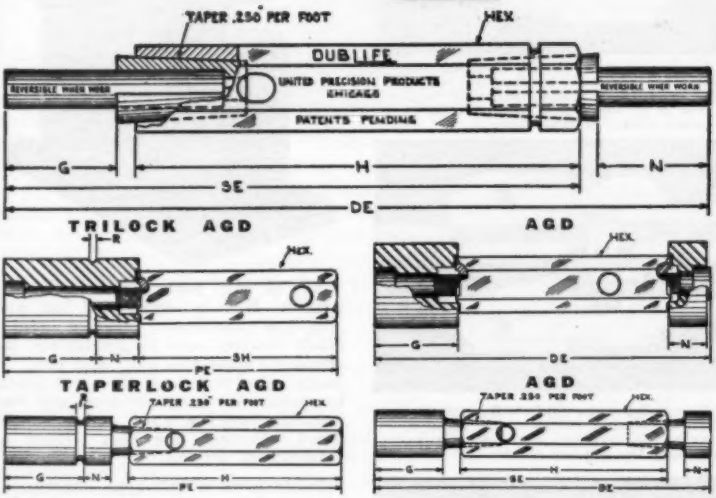
## An Assembly Aid

The Yale and Towne Mfg. Co., has developed a new use for Ames cotton industrial bags, using them to group sub-assemblies which are sent to the main assembly lines.

Related parts for assembly of electric industrial trucks and tractors, including lock washers, nuts, cotter pins, lugs, fittings and light machinery parts are placed in a bag or small group of bags in the stockman. The paper tag sewed into the bottom seam of the bag is marked for quick identification, and the bags are held in the stockroom until needed.

As the trucks and tractors move down the assembly line to the point where these parts will be needed, the bags of parts are sent out to the line. John R. McCarley, production manager at Yale and Towne, has determined that considerable time and labor are saved on the assembly floor because all parts sent in bags are readily accessible.


*The New* **DUBLIFE** *Gauges*



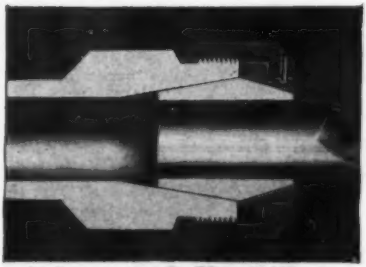

United Precision Products, exclusive manufacturers of Plug Gauges, announce a new improved DUBLIFE Gauge. The handle is made of hexagon material with bronze tapered collet which locks around the plug as it is driven into the handle. The plugs are reversible, so that when one end is worn the other end can be used, thus giving double life. 30,000 gauges in stock ranging from .030" to 1".

*A new catalog showing DUBLIFE and AGD Gauges will be sent to those requesting it on company letterhead.*

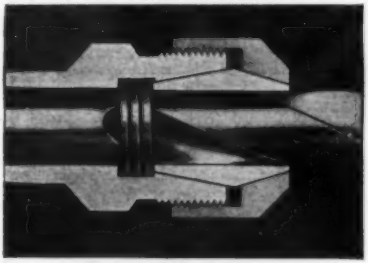
**UNITED PRECISION PRODUCTS CO.**

**4618 W. HURON ST., CHICAGO, ILLINOIS**

2 NEW FEATURES IN UNIVERSAL COLLET CHUCKS



In larger sizes Z, ZZ and XZ nut tightens against a floating sleeve which reduces locking effort by 50%. Nut is jet black and fluted for tightening with a spanner wrench.

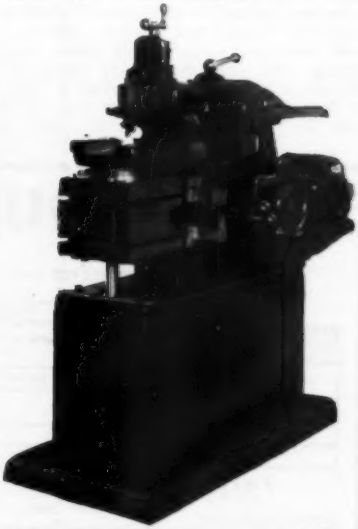


In smaller sizes OW, WW, and Y a release spring forces collet forward, as nut is loosened, automatically releasing the grip on the tool.

UNIVERSAL
Engineering Company
Frankenmuth, Mich.


## 8" "Shape-Rite" Shaper

The Sales Service & Mfg. Co., 473 N. Cleveland Ave., St. Paul, Minn., announces an improved Hy-Duty 8" Stroke Shape-Rite Shaper.



All of the parts are increased in weight. Ram is longer and has wider Vee-type bearings. Rocker arm is much heavier and is accurately balanced with the bull gear and ram. All gears are mounted on anti-friction bearings. Working surfaces and bearings are hand-scraped and accurately fitted. Castings are heat treated and relieved of strains.

Table is of a box-type construction, supported at outer end to avoid deflection, and provided with an elevating screw operated from left end of cross rail. Can be furnished with a swivel table at a slight additional cost. Also, swivel base vise.

Motor is mounted on a hinged base. The drive consists of Vee-belts and provides four speeds.

Floor or bench models are available. Floor model has a tool compartment.

## Air Conditioning

Under the title, "How Air Conditioning Builds Business Profits," the Airtemp Division of Chrysler Corp. has published a complete report of the first Round Table Clinic on Air Conditioning. This meeting brought together more than 50 vocational, professional, and business editors who reported on the applications and results of air conditioning in their respective fields. Their contributions and those of many who could not be present, together with material gleaned from research, are incorporated in the report.

It assembles in a single volume authentic information available on the varied applications of indoor climate control.

The report groups the "clinic" discussions under four general classifications:—(1) retail, (2) industrial, (3) modern buildings, and (4) health and therapeutics.

Air conditioning's aid to defense is outlined against a background of varied industrial applications. Pointing out that the world's largest installations are in mammoth new defense plants, the report cites many advantages to industry. It shows how air conditioning helps maintain production schedules by improving efficiency of workers and reducing time lost by illness; how it makes posible closer tolerances in precision work; protects finish, reduces deterioration, rust and corrosion; and helps to minimize the explosion factor and lessens fire hazard.

The report traces the influence of air conditioning on architecture, shows how it is responsible for new designs in factories, stores and dwellings.


I'LL GIVE YE

THREE DOLLARS

FOR EVERY $1.00 YOU NOW EARN!

Time . . . Labor! Those are two of the "bottle necks" of production that most manufacturers are faced with these days! In sanding . . . both of these bottlenecks can be broken with "Sandy", the Sterling Surfacer. Because (1) "Sandy" will do your sanding 3 TIMES FASTER, or (2) "Sandy" can do the same amount of sanding that THREE of your fastest handsanders can do! No wonder so many manufacturers have turned to "Sandy" to help them overcome these problems. A Sterling engineer will gladly help you on any sanding problems you may have.

*Write for more information TODAY!*

*SEND FOR FREE "HINTS" ON SANDING SAVINGS TODAY!*

**FREE** Send for "Hints on Sanding Savings" TODAY! Address Sterling Tool Products Co. 363 E. Ohio St. (D-5) Chicago, Illinois. Don't delay! Write at once! Only a limited supply of this valuable leaflet remains.

Sterling TOOL PRODUCTS CO.

363 E. Ohio St., Chicago, Ill.

# *The* PORTMAN OPTICAL PROJECTOR

The Portman Optical Projector was designed to meet the need throughout industry for a simple yet very accurate and rugged optical measuring instrument. Among the features combined in the Portman Optical Projector will be found the answer to practically every optical measuring requirement to be encountered in general shop work, in the tool room, in the laboratory and production departments.

## SPECIFICATIONS

Floor space occupied 24"x28"
Overall height 54"
Height above cabinet base 19"
Standard Magnifications 10, 20, 30, 45, 60, 80 and 100
Screen size 10½"x14"
Table movement 1" in both directions
Approximate shipping weight 300 lbs.

**PORTMAN MACHINE TOOL COMPANY**
MOUNT VERNON NEW YORK


## Cyclone-Type Dust Separators

Torit cyclone-type dust separators for collecting dust from grinding and polishing wheels are announced. They are available for use with or without filter bag collectors and draw dust-laden air from hoods surrounding polishing, grinding wheels, etc. Through centrifugal action, a high percentage of dust (75% to 95% reported by test) entering the dust separator falls into the bottom chamber. The small amount that does not separate from the air stream inside separator is exhausted through a center pipe having its outlet on top of the unit. The captured dust is easily removed when necessary through a door in the dust chamber—the only cleaning that is necessary.

Where filter bag collectors are used and there is a possibility that the bags will be overloaded by the great volume of dust to be collected, or clogged from sticky buffing lint, a combination filter bag cabinet and cyclone separator are advisable. Since the separator would catch 75% to 95% of the dust, only the finer particles would pass through to the filter bags. As a result, maximum suction would be maintained longer and the filter bags would not require cleaning as often.

The motorized Torit Separator is equipped with a ½ h.p., 3450 r. p. m. end-mounted motor, fan and housing placed on top as shown—a low-cost outfit for installation as indicated. The Torit Mfg., Co., 303 Walnut St., St. Paul, Minn. offer Bulletin No. 116 giving full details.

## Sub-contracts

Two fishing tackle companies, a watch concern, and a carpet mill are among the more than 400 manufacturers working with the General Electric Co. in a $20,000,000 subcontracting program, company officials announce.

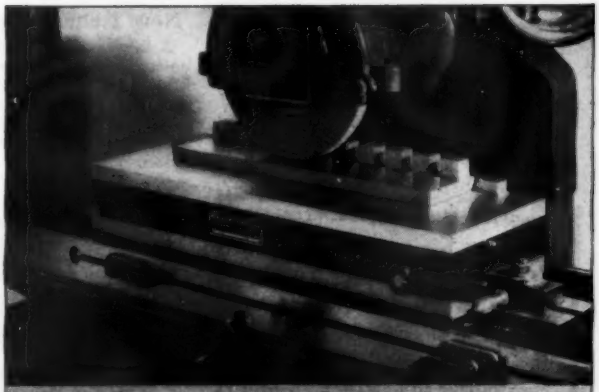
The Pennsylvania Fishing Tackle Co. and the Ocean City Mfg. Co., both makers of fishing reels, are producing delicate machine parts. The Waltham Watch Co. is supplying taper pins for precise machinery. The Mohawk Carpet Mills are manufacturing thermal tubes.

There are dozens of such unusual examples among the firms that are contributing by means of sub-contracts to the G. E. defense effort.

Nor does this co-operation extend in only one direction for General Electric also serves as a sub-contractor to other companies. For example, they make magnetos, super-chargers and other parts for airplane manufacturers.

Military radio apparatus is built with the aid of more than 150 selected subcontractors. For months the constant flow of these parts never has faltered.

Many other defense articles lean almost as heavily on the work of suppliers and sub-contractors. The powerful 60" searchlight represents the combined efforts of a score of firms. The metal mirror is ground and polished by companies in New Jersey, Virginia or Ohio. Its front-door glass is made by concerns in Pennsylvania or in Michigan. It uses arc-carbon from Ohio and arc-switches from Michigan. The aluminum castings come from still another concern in Ohio.

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Solve Your Holding Problems
with BROWN & SHARPE
MAGNETIC CHUCKS
(Permanent Magnet Type)
No Wires — No Heating — No Running Costs
Ask for circular describing the complete line of rectangular and rotary models.
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BROWN & SHARPE MFG. CO., PROVIDENCE, R. I., U. S. A.
BROWN & SHARPE

(Pronounced COLE'-MON-OY)

Remember when you could call up in the morning and have a new replacement part delivered in the afternoon?

Now it's quicker—cheaper — to hard-surface all wearing parts with COLMONOY. On machine tool parts such as lathe points, dogs, chip breakers, drill flutes, wire straightening shoes, thrust bearings, screw machine fingers, forming and drawing edges, centerless grinder rests COLMONOY No. 6 is proving invaluable. Equipment that must take a lot of punishment—perhaps for 24 hours a day—will operate efficiently, with less wear, when the proper grade of COLMONOY is used as a hard-facing for all parts subject to excessive abrasion and corrosion. It will pay *you* to investigate.

*Write today for catalog—and special information covering specific applications.*

**WALL - COLMONOY CORP.**

**Sixth Floor, Buhl Bldg., Detroit, Mich.**

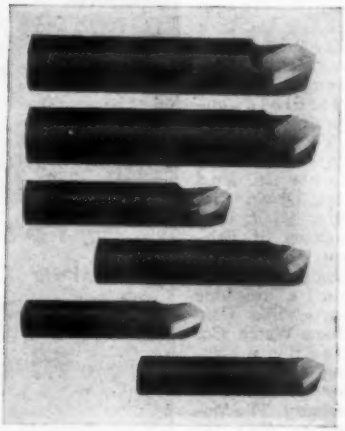
NEW YORK 551 W. 54th St. — TULSA 290 Midco Bldg. — BLASDELL, N. Y. 21 Seneca St.
WHITTIER, CALIF. 123 W. Philadelphia St. — CHICAGO 615 W. Jackson Blvd.

**COLMONOY**

*Hard Surfacing Alloys and Overlay Metals*

## New Kennametal Boring Tools

A new series of standard Kennametal boring tools with round shanks, to be known as Styles 27-R and 29-R, is announced by McKenna Metals Co., 135 Lloyd Ave., Latrobe, Pa., and was exhibited at the National Metal Exposition.



These new tools have the same tool angles as other standard Kennametal boring tools, a feature of which is the 12° positive back rake to compensate for the negative effect of the tool being held at height one-half the height of the shank above center. Style 27-R tool is for use in 30° boring bars, and Style 29-R tool is for use in 45° boring bars. They are supplied in common shank sizes.

Styles 27-R and 29-R tools are tipped either with Kennametal grade KM, the most widely used grade for machining steel, or with Kennametal grade K3H, the very hard grade used for precision boring and finishing cuts of all types. It is explained that because these two new styles have been classified as standard tools, shipments are made within ten days.

It is pointed out that time is saved by ordering standard tools and grinding them to the shape desired.

## Electrocuted

Almost 1000 persons are electrocuted yearly in shops and factories, it is estimated. This is a good record, when one considers the millions of horsepower transmitted to motors and countless other electrical devices. But this is not good enough, for the goal must be elimination of all unavoidable accidents.

The use of a low voltage such as 110 volts on tools is no sure safeguard, for many electrocutions have occurred at that level. Many of them may have been heart attacks induced by electric shock, and hence not true electrocutions, but the result was death just the same.

Research on the causes of industrial electrocutions reveals the following factors:

(1) Worker was usually unaware that an electric potential existed.

(2) The victim was innocent of any infraction of a safe practice or a safety rule.

(3) The voltage was about the same as that of a standard lighting circuit.

(4) In spite of a bad state of repair electrically, many tools can still operate.

Sixty-five electrocutions were studied by engineers of American Mutual Liability Insurance Co. In 16 cases defects in portable electric equipment caused the non-current carrying parts (supposedly insulated) to become charged and the victim's body provided a ground connection.

It is recommended that portable electrical equipment periodically should be "rung out" with a magneto or tested with some other ground testing device. Metal casings should be insulated to prevent contact—brass sockets are inexcusable. A third conductor wire to provide permanent ground for non-current carrying parts should be provided on 110 volt portable equipment unless conditions are entirely safe and can not deteriorate.


**DEFENSE WELDING** is definitely

C-F Positioner Welding

*In the armament section* of American Machinist for September the manufacture of arc welded gun carriages is described, in part, thusly . . . "Since all welding is down-hand, positioners are used wherever required." The positioners shown are C-F Welding Positioners. Not only here, but throughout industry, these time-saving machines which permit faster and better welding are definitely part of the defense job, in armaments, shipbuilding, transportation; everywhere. Investigation will probably show you that C-F Positioners will make your production welding simpler and more economical.

*C-F Positioners are available in hand operated or power driven machines with capacities from 1200 to 14,000 lbs.*

*Our bulletin W P 20 will give you the facts. It is illustrated, interesting and free upon request.*

CULLEN-FRIESTEDT CO.

RIVETING - PEENING - CLINCHING
PLUS SPINNING

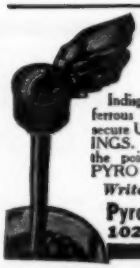
AIRFLEX
SPINNER MACHINE

- Riveting with a range of 1/32" to 3/8" plus spun round, oval, conical or flat heads.
- Pneumatic drive.
- Fast, Better and Lower Cost than Single Purpose Machines.
- Made in Bench, Pedestal and Radial Models.

*Send for complete information.*

NATIONAL PURCHASING CO.
405 Boulevard Bldg., Detroit, Mich.

PYRO



Indispensable in any MODERN non-ferrous foundry. Reduce spoilage and secure UNIFORM SOUND CASTINGS. Patented clamping device stops the pointer at correct indication — a PYRO feature.

*Write for our bulletin No. 110.*

Pyrometer Instrument Co.
102 Lafayette St. New York

## Grinding Wheel Dresser

The Ideal Commutator Dresser Co., 1441 Park Ave., Sycamore, Ill., announces a new abrasive wheel type Grinding Wheel Dresser that is said to give a cutting and truing effect almost equal to that of a diamond.

The cutting wheel is held in a protective metal housing which deflects the grindings away from the operator. A large handle makes it convenient to hold and use. The cutting wheel is replaceable when necessary.

Besides general cleaning and truing of a grinding wheel, other uses include the truing of cut-up and uneven sides, dressing out deep grooves and out-of-roundness, restoring out of balance wheels into true rotating ones. It can also be used to shape wheels into different forms when form grinding is desired.

Overall length is 13-¾"; weight 3-⅛ lbs.

SPECIAL HEAVY DUTY
110 V–220 V–440 V
DEMAGNETIZERS
SIZES UP TO 18"x24"
*Rapid Delivery*
R. B. ANNIS COMPANY
INDIANAPOLIS, IND.

## Saving Tin

It is well-known that tin is a strategic material. It is nearly all imported and comes long distances. It has been found that about 20% of our tin is consumed in the form of solder. There are several ways in which to avoid the use of tin-lead solder under certain conditions

The "Dutch Boy Quarterly" states that silver-lead solder is feasible as to cost, for only 2½% silver is used. An outstanding characteristic of this solder is its strength at high temperature. It is not a universal substitute for tin-lead solder, however, for its melting point is 580° compared to 360° for tin-lead.

From the standpoint of the buyer, the use of silver-lead solder depends on the soldering temperature allowable. Obviously, some materials now being joined with solder might be seriously damaged if not destroyed by the high temperature necessary. In some automatic soldering operations, new and more elaborate equipment might be necessary. For joint wiping and in various other hand soldering applications, the silver-lead alloy could not be used at all.

Cadmium and zinc solders employing neither lead nor tin exist, but the shortage of both cadmium and zinc at present make them hardly worthwhile as substitutes, it is explained.

Another suggestion is the use of solder in which the tin content is reduced or replaced in part by other metals. A wiping solder is available consisting of 68 per cent lead, 23 per cent tin, and 9 per cent cadmium.

MONEY
TWO WAYS WITH A COVEL No. 15

1—ON SPECIAL JOBS the Covel No. 15 Hand Feed Surface Grinder is quickly adapted to many purposes. At top left, workman in tool room is grinding punches. The long holder contains adjustable supports for grinding punches at different heights. In use, punches enter die singly.

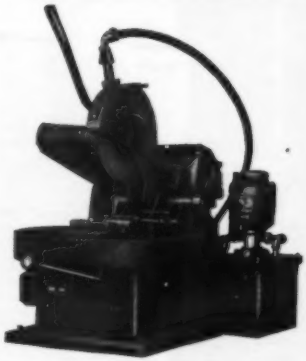
2—ON PRODUCTION JOBS No. 15 combines precision with production. In lower picture, a variety of cemented carbide tools are being ground. In both cases, the versatile Covel No. 15 will save you money by releasing more costly machines for special work. And you save on the quick set-up—the low purchase price and operating costs.

EARLY DELIVERIES are available for Defense industries. Write, wire or phone for Bulletin 440 and name of your Dealer.

Grinding Machinery Since 1874
COVEL INDUSTRIAL GRINDERS
COVEL MFG. CO., BENTON HARBOR, MICH.

# ABRASAW -

## BRIDGEPORT NO. 47W WET CUT-OFF MACHINE



More, better and cheaper cuts on practically all materials, are produced by the new Bridgeport "Abrasaw". Cutting speeds are unbelievably fast, material is handled with facility and the polished cuts often eliminate secondary operations.

•

*Let us send bulletin giving details.*

**Bridgeport Safety Emery Wheel Co., Inc.**

1304 WEST BROAD ST. - BRIDGEPORT, CONN.


## Starrett Book for Student Machinists

As a timely and practical contribution to defense training, The L. S. Starrett Co. of Athol, Mass., has just published a manual of modern shop practice called "The Starrett Book for Student Machinists." Combining much of the material formerly published in two popular Starrett books, the new book is actually both an instruction manual and a ready-reference handbook.

In order to make the book up-to-date and as practical and useful as possible, the text was prepared in cooperation with a number of leading vocational school and industrial shop training instructors. It contains 184 pages, over 200 diagrams and photographic illustrations and 30 reference tables. The book is completely indexed and covers a wide range of subjects. Written in clear, simple shop language, it includes such essential chapters as: how to read working drawings, precision tools and measuring practices, how to read a micrometer and a vernier, fits and limits of tolerance, bench work, chipping, filing, metal sawing, drilling, lathe work, screw threads and tapers, tool-making, jigs and fixtures, etc.

This new book is printed on high grade paper and is bound in sturdy, soil-resisting, red Terek cloth. It sells for only 75 cents per copy.

## Lighting

United States defense industries now use two to five times more light than ever before over work benches and production aisles to speed output and minimize possibilities of accidents involving workers. Our 6,000,000 industrial workers handling complicated machinery are safer from injury than at home or in automobiles

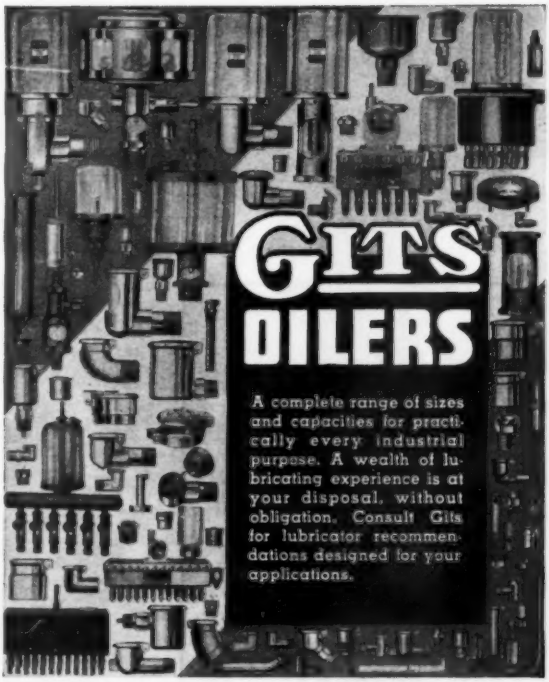
This has been aided definitely by the development of new light sources such as fluorescent and mercury vapor lamps now widely used in factories. Industrial leaders realize that more light flooding our work areas increases efficiency and cuts down injuries at a time when production must not be disturbed.

In recent years surveys show that light in factories throughout the nation has been rated at an average of about 10 footcandles, as compared with ideal light in the shade of a tree of approximately 1,000 footcandles. Under such conditions, statistics reveal that about 140,000 injuries could be expected in a year.

In many defense plants today, lighting intensities are maintained at averages varying from 30 to 50 footcandles. For close work as many as 100 footcandles are supplied the workers.

Until research laboratories successfully developed fluorescent and mercury vapor lamps it had not been practical nor possible to raise lighting levels in industry. The fluorescent lamp, however, is cool, is aproximately twice as efficient as an incandescent, supplies glareless light, and is economical to operate when burned long periods of time. Mercury vapor lamps have also become an important source for an abundance of light under certain conditions.

More than 10,000,000 fluorescent lamps are now in use.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A complete range of sizes and capacities for practically every industrial purpose. A wealth of lubricating experience is at your disposal, without obligation. Consult Gits for lubricator recommendations designed for your applications.
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1860 South Kilbourn Ave.
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30 years of oil cup experience

**VIBRATIONLESS TOOL GRINDING!**

**Makes your Tools Cut Better and Longer!**

***OTHER FEATURES OF HISEY GRINDERS***

**Totally Enclosed Motor**
**Push Button Starter**
**Sealed Ball Bearings**
**6 inch to 24 inch Wheels**
**Exhaust Guards**
**Adjustment for Wheel Wear**

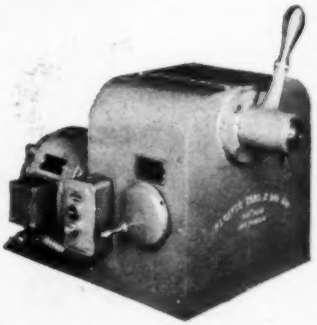
**Catalog 60 AB also lists a complete line of Wet Tool Grinders**

**The Hisey-Wolf Machine Co.**
**Cincinnati, Ohio**

## The New Pacific "Vera-Lathe"

An improved second operation machine, known as the Pacific "Vera-Lathe" with an infinite number of variable spindle speeds from 5000 down to 1250 r. p. m., with a hollow spindle design and a novel collet operating mechanism, has been introduced by Pacific Tool & Die Co., 1225 East 63rd St., Los Angles, Cal.

Especially designed for polishing, buffing, burring, filing, sizing, finishing and lapping round parts, it is said to embody several principles not usually found in machines of this type.



One interesting feature on the front end of spindle, is the "Vera-Handi" Collet Operating Mechanism. This design permits spindle to rotate while the work is inserted into the collet, making it unnecessary to stop the lathe to chuck the work. Interchangeable spindles are available.

The spindle is ball-bearing mounted, and has a hole its entire length, through which passes a hollow draw tube with a 13/16" bore for holding the ¾" maximum capacity collet. Tension of the collet can be easily adjusted.

Various spindle speeds are quickly obtained by turning a handwheel. Special speed ranges can be furnished on request. Power is supplied by a ½ h. p. motor.

## Welding

The Lincoln Award of 1940-41 for the technical paper contributing most to the year's development of welding has been awarded to Mr. Robert H. Aborn, research scientist with U. S. Steel Corp. His study was on "Metallurgical Changes at Welded Joints and the Weldability of Steels," which included the following interesting points:

"A high-quality welded joint in any given steel requires a sound bond, minimum distortion and low internal stress, and a tough structure free from martensite. The first two characteristics are promoted by well - recognized welding technique; the last is controlled by cooling rate."

"Any steel can be welded satisfactorily providing a sound bond can be made and that due precautions are taken to insure that no zone cools so rapidly as to result in the formation of the brittle constituent martensite. Such a limiting cooling rate can be estimated from the isothermal transformation diagram (S curve) of the particular steel, and specified exactly if the transformation behavior during continuous cooling is known.

"The application of this principle requires consideration of all factors which, in a given case, influence the rate of temperature drop in the potentially dangerous zone near the weld—for instance the thickness and initial temperature of the parent metal, the type of welding process and how it is conducted. This paper shows how this limiting cooling rate may be determined, and also discusses some of the characteristics of weld metal and of dimensional changes which occur in welding."

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STEEL!
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Department
RIGHT THROUGH is right, just as you've been drilling soft steel. For example, you can drill gauge pin holes and screw and dowel holes in hardened die sections without removing. No more rejects from holes oversized, warped, distorted or not matching in hardened pieces. Great savings are possible. Get the facts now!
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5005 EUCLID AVE. • CLEVELAND, O.

## Every *MODERN* Plant *NEEDS* This Machine

**Universal Carbide Tool Grinder**

If you employ cemented carbide tipped tools in your plant you will want to know that this machine tool performs all the necessary operations for their upkeep. If you don't—well, excuse us for wasting your time and our own.

*Bulletin CTG40-11H gives you details.*

**K. O. Lee Company**

*Aberdeen, South Dakota, U. S. A.*


**NEW SOUTH BEND TURRET LATHE**

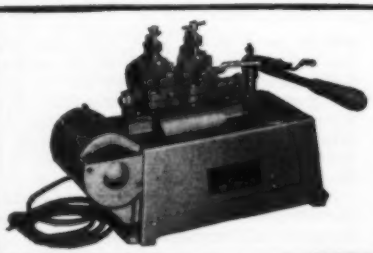
Here is the new 16" swing South Bend turret lathe designed for rapid production on chucking operations and bar work. It is made by South Bend Lathe Works, South Bend, Ind.

## Modern Clutch Facings

Improved Asbestos Clutch Facings covering the complete range of industrial, as well as automotive service requirements, are announced by the Gatke Corp., 228 N. LaSalle St., Chicago.

Made of different material combinations and various methods of processing to meet operation conditions, these modern Clutch Facings are furnished in sizes from 14 feet in diameter weighing 1000 pounds and more, to tiny discs weighing less than an ounce.

Gear-Toothed Clutch Facings with integrally moulded teeth and Cone Type Clutch Facings, as well as the conventional Disc Type are available in all shapes and sizes.

## BAND SAW WELDERS

The No. 141 Bench Type Metal Working Band Saw Welder is available with or without grinder. Work can be annealed without removing from the Welder. Band saws up to ¾" wide may be welded.

1 KVA—110 Volt—60 Cycle—single phase—5 point heat control—1 point anneal heat—Weight 40 lbs. Let us send you further details.

*Mfrs. of complete line of Spot, Butt, Seam, Flash, Projection and Special Welders.*

**WELDEX INC.,** 7325 McDONALD AVE., DETROIT, MICH.

## Refrigerated Welding

Refrigeration of the electrodes of resistance welders has been introduced by Progressive Welder Co. This novel principle is said to increase the rate of welding of aluminum and stainless steel. Refrigerating units offered may be employed not only on Progressive welders but also on other makes.

Believed to be the first time "refrigerated welding" has been made commercially available, the unit is claimed to permit continuous welding of four to 10 times as many spots in aluminum without requiring point dressing.

When used in combination with a spot welding machine, the unit reduces electrode temperature to a point where—in spite of the high heat necessary to produce a weld—electrodes will be continuously covered with frost. It is said that this reduction in temperture has so increased point life that 10 minute runs, continuously, at 100 welds per minute without point dressing are not unusual for the combination of a three-phase aluminum welder and the new refrigerating unit.

Primary function of the refrigeration is to keep the welding point cool at the point of contact. In resistance welding heat is generated at three primary resistance points, these being:—(1) at the point of contact between the pieces being welded together, (2) at the point of contact between the "upper" piece and upper electrode, and (3) between the "lower" piece and the lower electrode.

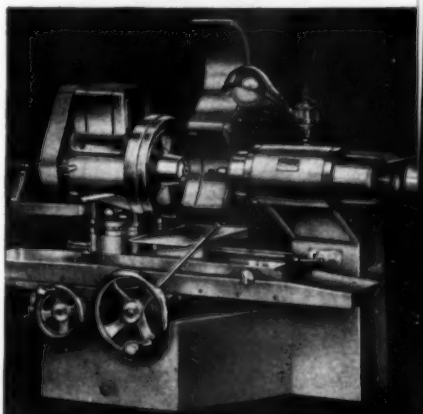
Only the first, of course, is desirable, the other two tending to soften and permit deformation of the electrode tip—also producing pick-up by alloying of the tip with the material being welded.

Experimental production to date indicates a complete elimination of pick-up when the refrigerating unit is used, particularly on aluminum and stainless steel welders. Retention of tip shape by preventing softening is also achieved.

Sore thumbs in your small part production lines? Too often the precision grinding of small components is done by machines too large to economically do the job. GRENBY PRECISION BENCH GRINDERS have been engineered to produce accurate grinds on small parts in minimum time. . .

The GRENBY line includes Internal, External, Flute, Cutter and Surface Grinders. . . . . .

*Send for the GRENBY Catalog*



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PLAINVILLE CONNECTICUT

Universal
DRILL BUSHINGS ARE SPEEDING UP DEFENSE PRODUCTION
In scores of defense and manufacturing plants Universal drill bushings are doing an outstanding job.
Because of their superfinished bore straight and round within .0001 Universals assure accuracy and unexcelled wearing qualities. All standard sizes available. Write for facts and prices.
UNIVERSAL
Engineering Company
Frankenmuth, Mich.

## Atkins Improves Segmental Saws

A further improvement in its recently developed line of Segmental Cold Saws is announced by E. C. Atkins and Company, Indianapolis, Ind. This improvement is known as "relief grinding," and consists of an additional grind along the side of each individual tooth. This relief is ground at an angle which is slightly greater than the angle of the tooth. It is emphasized that its effect is to break up the continuous line of friction on side teeth present in saws lacking such relief grind. A further advantage is that the depression formed by the additional grind helps carry cooling or cutting compound back into the cut, which, in turn, helps keep the saw cool. Still another claim made for relief grinding is that it is a definite aid in eliminating wander in the cut.

The saws which incorporate this new development, are characterized by the new Atkins tooth design for power metal cutting saws. Known as the "Curled-Chip" tooth, it is explained that these new teeth have an inwardly curved, large-size gullet and a tooth shape that cuts metal like a lathe cutting tool. Chips actually curl up inside the curved gullet and eject themselves like coiled clocksprings at the end of the cut.

The name "Segmental" for Atkins new Cold Saws springs from the fact that teeth come in replaceable segments. Damage to a single tooth or group of teeth is repaired by merely affixing a new segment to the blade of the saw.

## Davis Micrometers and Standards for Large Dimensions

A new bulletin on their tubular micrometers and standards is announced by Davis & Thompson Co., 6619 W. Mitchell St., Milwaukee, Wis. Micrometers employ a light but rigid frame of hollow, cold drawn steel available in both bow type (up to 96") and bar type (up to 168"). Davis standards of seamless steel tube with hardened tool steel ends are available in any size required for a particular job at hand.

## Tin Plate

An industrial "miracle" is occurring in the cold-rolling of tin plate, steel thinly coated with tin to become the well-known tin can. Seven years ago Westinghouse took considerable pride in noting that the delivery speeds of the mills had increased from 400 to 500 feet per minute. Each year since recorded further increases from 800 f. p. m. to 1000, to 1200, to 1500, and then to 2000. Each time engineers wondered if this skyrocket rise was not to end soon. Last year saw a new figure—2700 f. p. m. Also, the success of a new scheme assures that still higher speeds are to come.

To increase cold-rolling speeds by 700% in 10 years is significant, but consider further what this means. The cold steel is squeezed from 0.076 inch thick to 0.01 inch thick while racing at 30 miles per hour, through four or five stands set close together, and held to within five ten-thousands of an inch of the correct gauge. (This is of the order of fine machine tool tolerances.) The pressure on this ribbon of steel in a pair of rolls may be a million pounds, and the tension between rolls may be 15 tons per square inch. Not only is the gauge maintained at the full speed of 2700 f.p.m. but also during the acceleration to this speed from a low threading speed.

Primarily responsible for these accomplishments are the direct current driving motors that run in absolute synchronism. The last stand runs about 7 times faster than the first one; even so, the motors maintain the same relative speeds through the entire range of speeds and loads, and the tension on the strip is absolutely constant.

This feat is accomplished by a scheme known as IR-drop compensations applied for the first time. A booster generator, motor driven, is connected in series with each motor and adds to it a voltage always equal to the voltage drop caused by the load current in the motor armature.

SPEEDS UP PLANE PRODUCTION
Equipped with McGILL Bearings
This No. 2 Bakewell Fast Precision Tapping and Threading machine, made in Los Angeles, is used extensively in airplane plants.
McGILL Precision Ball Bearings of the Single Row Shielded Series, the Single Row Non-Shielded Series and the Double Row Maximum Capacity Series are built into this machine. There must be a reason.
GET OUR CATALOG AND LEARN MORE ABOUT McGILL BEARINGS
Bearing Division
McGILL MANUFACTURING CO.
1700 North Lafayette Street
VALPARAISO, INDIANA

# EXCELSIOR No. 14 ANGLE ROLLING MACHINE

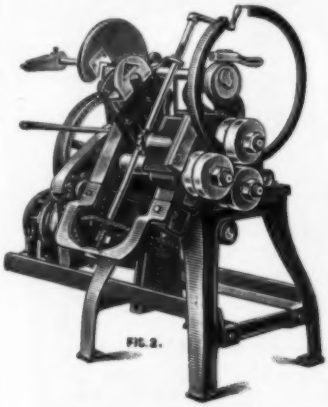


FIG. 2.

Capacity 2x2x¼" Angles. All the rolls are direct driven avoiding slipping of the material between rolls, which are operated by the oversize Excelsior friction clutch. Write for Price and Testimonials.

We specialize in Automatic Grinding and Polishing Machines, to polish Stainless Steel Sheets, Automobile Bumpers, and parts, Stove and Range Top Castings, Electric Iron Sole Plates, etc.

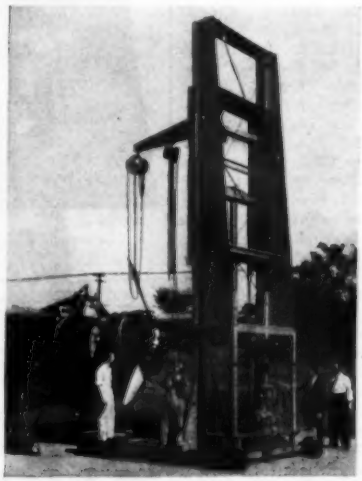
Also Inside Cutting Shears, Deep Throat Power Punches for duplicate work by the use of horse shoe templets up to No. 12 gauge. Used in Stove, Range, Air Conditioning and Kitchen Equipment Plants.

**EXCELSIOR TOOL & MACHINE CO.**

**East St. Louis, Illinois**


## Handling Bomber Engines

The Lyon-Raymond Corp. (formerly Lyon Iron Works), 856 Madison St., Greene, N. Y., reports recently furnishing one of the aircraft companies, probably one of the largest Hydraulic Portable Elevators ever built. This elevator was designed for installing or removing the engines on large bombing planes. Illustration shows the elevator in use with a small plane.



This elevator has an elevating boom and also a removable elevating platform. The capacity is 5,000 lbs. The platform, which is not shown, is 6' wide by 7' long. Lowered height of platform 2', elevated height 16', elevation 14'. Boom swings 12° each side of center, operated by hand chain through worm and gear.

The lowered height of boom from floor to center of pin for chain falls is 9' 5-½". This pin may be placed 7' out from carriage or at intermediate points. Elevation of boom 14'.

The unit is 9' wide overall, 12' 6" long and 26' high. This elevator is equipped with eight 12" x 4" rubber tired wheels with ball bearings, front wheels with auto type steer.

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Forged Steel
Quick Acting
Deep Reach
Welders

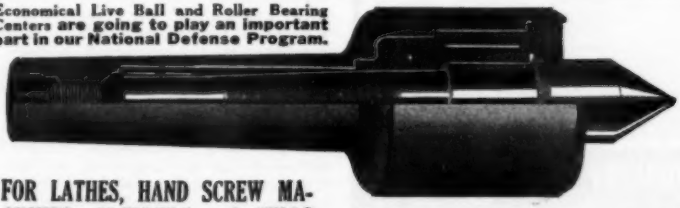
Sizes Available:
¾" to 10" opening
½" to 16" deep

Write for CATALOG and PRICES on Clamps for all purposes as well as many other tools for use in the Machine Shop.

IN STOCK AT YOUR SUPPLY HOUSE

**The Cincinnati Tool Co.,** 1945 WAVERLY AVE., CINCINNATI, OHIO

**Economical Live Ball and Roller Bearing Centers are going to play an important part in our National Defense Program.**



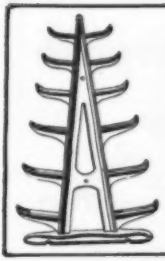
**FOR LATHES, HAND SCREW MACHINES, GRINDERS and MILLS**

**The features that interest you most:**

1. Simplicity, sturdiness, and heavy duty.
2. 50% more radial load carrying capacity than the average live center.
3. Large spindle, small head, short overhang, most desirable for rigidity and to be free from chatter.
4. With the aid of cap screw you can lock spindle to redress point right in your machine.
5. Special oil seal to retain lubricant and keep out foreign matter.
6. A compression pad to compensate for heating and expansion of metal as a safety factor, with reasonable diligence exercised.

*A folder giving prices and complete detail will be mailed to you upon request.*
*A ten day trial. If not perfectly satisfied your money will be cheerfully refunded.*

**MOTOR TOOL MANUFACTURING CO.,** 12282 TURNER AVE. DETROIT, MICHIGAN



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Steel Racks

Save time, steps and money by keeping bar stock, shafting and pipe out of the way and off the floor.

*Write for full details.*

The Western Tool & Mfg. Co.
Springfield, Ohio



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Let Us Do Your Special Gage Work

We have every facility — adequate precision equipment and expert workers—for the quick and efficient production of all types of Gages, Special Tools, Dies, Jigs and Fixtures, large or small. We have complete heat treating equipment and can handle jig boring jobs on our 18"x36" Pratt & Whitney jig borer. Have been delivering satisfaction since 1929.

Address all inquiries to Ray W. Rice, Manager.

QUALITY TOOL & DIE CO.
401 N. Noble St., Indianapolis, Ind.


Platform and boom are elevated by hydraulic hoist and 3 h.p. motor driven hydraulic pump. Elevating and lowering is controlled through Solenoid valve operated by "dead man" type controller. One station is located on elevating carriage conveniently located to operate from platform and a controller is also mounted at frame base. Cable reel is furnished to carry control wires. Speed of elevation is approxmately 12' per minute.

## Foote-Burt Announce Hand Feed Surface Grinder

The Foote-Burt Machine Co., Cleveland, announces the Hammond No. 2 Hand Feed Surface Grinder. It is described as a precision tool room machine for use on the most accurate work, featuring rugged construction which prevents vibration.

Spindle is direct motor driven, mounted on precision pre-loaded ball bearings. The spindle carrier is mounted on double dovetails with adjustable tapered gibs. Any one of three spindles assemblies, the Hammond, Ex-Cell-O or Parker, is available with the machine at the standard price. The hand wheel for raising and lowering the spindle is graduated in half-thousandths. Total vertical adjustment is 10¾". Automatic take-up on the spindle elevating mechanism compensates for wear on the screw or on the nut. The spindle is arranged to take 7" diameter by ½" thick grinding wheel with 1¼" hole.


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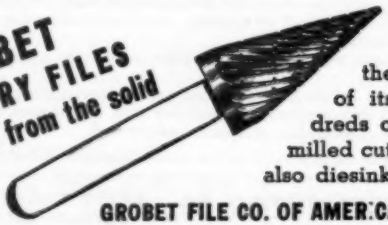
ROTARY FILES
ground from the solid



Ask for Catalog WG

the most complete catalog of its kind, illustrating hundreds of rotary files hand cut, milled cut, ground from the solid; also diesinkers' burs.

GROBET FILE CO. OF AMERICA 3 Park Pl., New York, N. Y.

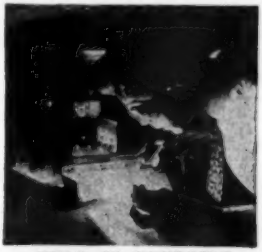
Table has a working surface of 6"x 18" and is provided with tee slots for holding the work. In and out movement of 6½" of the table is by means

of a cross feed hand wheel graduated in thousanths. Cross feed screw is mounted on ball bearings. Longitudinal travel of the table is 18". The travel is by means of an adjustable roller chain arrangement which is reported to provide unusual smoothness of table travel, eliminating tooth marks sometimes found with other types of drive.

Lubrication is by means of a one-shot pressure system that forces lubricant to all moving parts except the spindle proper. Dust guards are provided. Two shelves inside the base provide convenient storage space for tools, extra wheels, etc.

Standard equipment includes motorized spindle, motor starter, 7" grinding wheel, diamond tool holding bracket and wrenches.


**MAGIC Electro Welder**



**WELD IT YOURSELF**

This handy, moderate size, useful welder, which sells for $35.00 is designed to handle odd small jobs that would otherwise tie up large expensive welders. Several located in your plant will save trips to the welding department. Easy To Use.

Will weld, braze or solder. Can be used for small butt, lap, or fillet welding. Welds fractures in cast iron; fills cracks and pits in bronze and aluminum castings and builds up bearings, gears, worn shafts, etc. Plugs into any 110 volt a. c. outlet. Guaranteed for one year.

*Write for details.*

**Magic Electro Welder Mfg. Co.**
**239-241 CANAL ST., NEW YORK, N. Y.**

**5000 SHAPES AND SIZES GROBET Swiss Files**

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The most complete catalog of its kind. Lists 5000 different shapes, sizes and cuts of GROBET Precision Swiss Files. Ask also for catalog WM on files for filing machines.

Learn more about these Chrome Steel Files that have won a reputation for utmost precision and durability.

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**INEXPENSIVE MICROMETERS**

*Sold Under a Money Back Guarantee*

**Complete set $19.95**

Consists of: 0-1" Micrometer, Outside. 1-2" Micrometer, Outside. 2-4" Micrometer, Outside (2 thimbles). 2½-4" Micrometer, Inside (3 measuring rods). Velvet Lined case.

*Write for FREE descriptive Catalog.*

**MICRO PRODUCTS CO.**

210 JOS. CAMPAU DETROIT, MICHIGAN


## Salt Bath Furnace Design

A new record in electric salt bath furnace pot design is reported in connection with a new high temperature pot recently placed in operation by a manufacturer of High Speed Steel Saw Blades of molybdenum and tungsten alloys. Used for the high heat hardening stage and one of nine furnaces built by Upton Electric Furnace Div., Detroit, this type of deep pot is especially designed for hardening long broaches, knives, etc.

It is stated that prior to development and use of the Electrothermic - Permeation principle of operation, excessive pot depth in conventional types of salt bath furnaces made mandatory a proportionate increase in the area.

The pot shown, which is 30" inches deep and 18"x12" inches at the top, capable of handling up to 6000 blades per day is heated internally by means of two electrodes placed diagonally and converging in such a way that the greater amount of heat is generated at bottom of the pot. The natural, resulting convection supplies sufficiently vigorous circulation of the heated salt so that the saw blades, which are up to 25-½" in length and suspended in the

**GREATLY INCREASED WHEEL PRODUCTION**

**FAR BETTER TOOL FINISHES ON YOUR CEMENTED CARBIDE TOOLS**

**The Only Product Designed Specifically to Lubricate Diamond Wheels.**

**ADDS MUCH TO YOUR WHEEL AND TOOL LIFE.**

**OVERCOMES THE LOADING AND GLAZING OF YOUR WHEELS.**

**Widely used in the industrial trades and highly recommended to you by various equipment and tool manufacturers.**

**Economical to use** **Immediate Shipments** **ALL SIZES AVAILABLE**

*NOTE—Try your equipment or tool jobber first, for your needs or write*

**STADOIL MANUFACTURING COMPANY**

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MODEL 25

# MARK YOUR PARTS

*Permanently*

PART NUMBERS, CATALOG NUMBERS,
HEAT NUMBERS, SERIAL NUMBERS,
PATENT NUMBERS
MANUFACTURER—INSTRUCTION DATA—INSPECTION

Positive, Permanent marking on your products assist prospects to order. Makes it easier to buy—new, repeats and repairs. Gives you a definite record of pertinent data on each part produced.

The Pneumatic marking machine illustrated is our HI-DUTY model 25 general purpose tool for short runs or production work. It operates from your shop air line and is one of numerous models built to produce neat, permanent markings quickly on metal fabrications.

We will be happy to make specific recommendations upon receipt of samples or prints of parts to be marked, showing approximate lettering, its location on the part, with required hourly production.

**MARKED PARTS ADVERTISE**
**IN THE RIGHT PLACE, AT THE RIGHT TIME.**

*Send for complete catalog of our full line of marking Tools, Machinery and Equipment.*

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**QUALITY** *Strand* **SERVICE**

# FLEXIBLE SHAFT MACHINES

**OVER SIXTY TYPES AND SIZES—⅛ TO 3 H. P.**

ROTARY FILES

ROTARY CUTTERS

**VERTICAL**

## N. A. STRAND & COMPANY

**CHICAGO**
**5001 - 5009 NO. WOLCOTT AVE.**

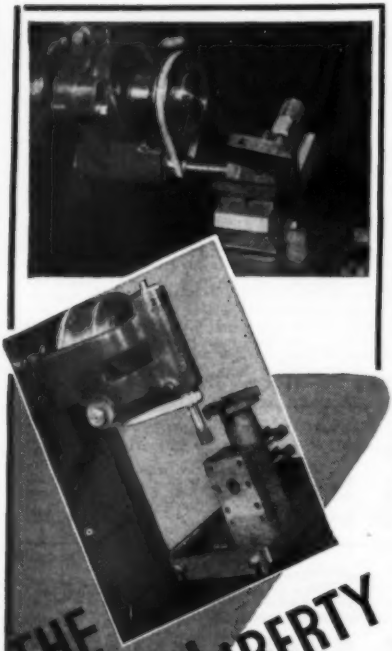
pot, will be uniformly heated throughout their entire lengths. Approximately 30 batches of 20 blades each are currently being hardened per hour at 2350° F.

Some idea of the insulation necessary to handle molten salt at such temperatures is had from the types of insulating materials employed. Molded insulating material extending down from the top is backed up by a layer of ceramic insulating bricks that cover not only sides and bottom of the working space but also insulate the alloy steel pot. This steel pot is separated from the outside welded plate shell by additional insulating material.

## Electronic Control Bulletin

A technical and reference bulletin (No. S-41), covering its complete line of resistance welder heat-controls, synchronizers, and synchronous timers, as well as its line of power and control units for welding equipment and automatic machinery, has been issued by Weltronic Corp., 3080 E. Outer Drive, Detroit, Mich.

In addition to descriptions of the individual units, the bulletin also contains general technical material dealing with the application of welding controls. Described in Weltronic bulletins for the first time are several resistance welding control developments, including an automatic preselective heat rise control as well as a control providing automatic heat regulation for each electrode on multiple-electrode welding machines such as the new ultra-speeds, hydromatics, etc., as well as for individual pulsations in pulsation welding.


Designed for quick, simplified setups for the best results in tool-room, die shops, and grinding rooms. Excellent for grinding gages, angles, slots, recesses and surfaces.

The Liberty High Speed Grinding Attachment eliminates needless time wasted in set up on surface grinders, as it takes but a few minutes to attach.

LIBERTY TOOL & GAGE
225 GEORGIA AVE. WORKS PROVIDENCE, R. I.

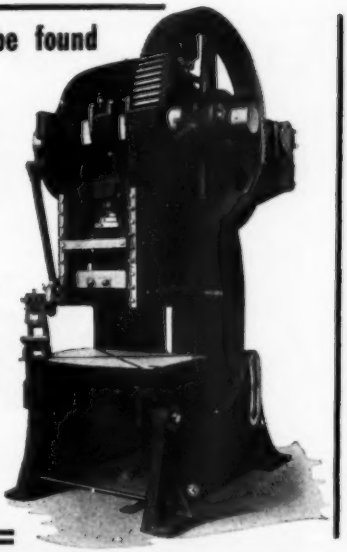
SCHAUER Speed Lathes
Variable Speed
Ideal for tapping filing, polishing small metal and plastic parts.
Write for Catalog 400.
Schauer Machine Co.
2064 Reading Rd.
Cincinnati, Ohio

Some of thes features are to be found in most presses - - but only

NEW
ROCKFORD
PRESSES

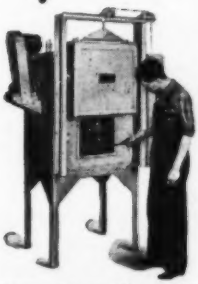
HAVE THEM ALL

- ★ Crankshaft is chrome-nickel forging, all one piece, no collars, heat treated and ground.
- ★ Main bearings are on a 45 degree angle.
- ★ Bronze bushings in main bearings, connecting rods and fly wheel.
- ★ Connection has clamping device without saw slot.
- ★ Timken bearing back shaft.
- ★ Cushion band brake, easily adjusted.



ROCKFORD IRON WORKS, INC.
ROCKFORD — ILLINOIS

Speeds DEFENSE Production



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For TOOLS • DIES • PRECISION PARTS NON-FERROUS CASTINGS AND PARTS • HEATING ALUMINUM • FORGINGS AND RIVETS • METALLURGICAL LABORATORIES

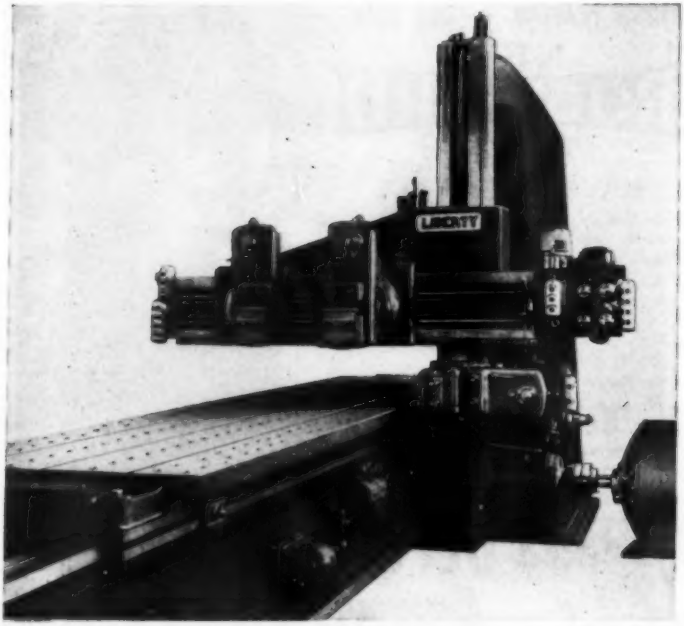
Accurate—Uniform—Flexible—Convenient—Speedy Range 275°F. to 1250°F.

Despatch Utility Furnaces equipped for either Despatch Gas "Controlled Combustion" Heater or Despatch Electric Heater.

*Write for Bulletin No. 83-C*

DESPATCH OVEN COMPANY
MINNEAPOLIS MINNESOTA

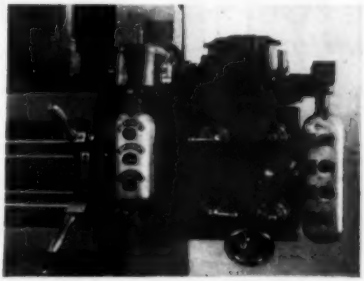
## Liberty Planers Offered in Many Sizes




Various sizes and types of planers are offered by Liberty Planers of Hamilton, Ohio. "Standard Design" machines, open side or double housing type, are presented in sizes ranging from 22" or 24" up to 48". The double housing units are excellent for work lying within a known range, while the open side models are highly flexible and useful for diversified lines of production.

The makers emphasize that these machines feature a patented feed arrangement which allows feed to take place on the cut or return stroke. The operator can control the feed on rail heads at any time without stopping machine. A dial indicates the amount of feed.

Liberty planers of new design for heavy duty and fast operation are available in sizes ranging from 36" to 72". Types offered are double housing, open side, die block, and convertible models. The convertible planers combine the versatility of an open side with



# NICHOLSON CONTROL VALVES

are made in two, three and four-way types for air, oil, water, steam, gas, etc., pressures to 5000 lbs. Style E is a general purpose valve for pressures to 300 lbs. Various metal combinations to suit any medium. Style J is for air and oil only, pressures to 125 lbs. Style H is a balanced hydraulic valve for pressures to 5000 lbs. We also manufacture foot, solenoid and motor-operated valves.

Style J

Style E

Style H

*Bulletins on request.*

*OTHER NICHOLSON PRODUCTS: Mandrels, Arbor Presses, Flexible Couplings, Steel and Stainless Steel Floats, Steam Separators, Steam Traps, Air Separators, Air Traps, Air Vents, Etc.*

**W. H. Nicholson & Company**

117 OREGON STREET WILKES-BARRE, PA.



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HEAVY DUTY

LIVE CENTERS

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AUTOMATICALLY COMPENSATED FOR EXPANSION, SHOCK AND WEAR

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**STURDIMATIC TOOL COMPANY**

5229 THIRD AVE. DETROIT, MICH.

**SAVE Labor and Time**

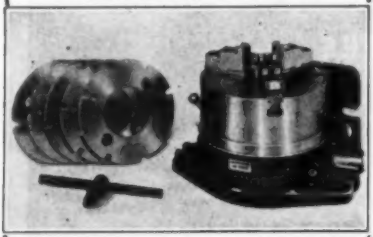
Eliminate heavy lifting. Cut handling costs. Table swivels and locks in any position. Can be varied 15½" by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

*Send TODAY for illustrated catalog No. 2.*

**MIDWEST TOOL & ENG. CO.**
**112 Webster St., Dayton, Ohio**



**FOR MILLING, DRILLING, SLOTTING, OR PLANING**



**FOR ONE PIECE— —OR FOR THOUSANDS**

The HARTFORD "Super-Spacer" indexing fixture was designed to meet the demands of modern feeds and speeds. Its unequalled versatility fits it equally well for special work or for production jobs. Quick set-up—rapid, accurate indexing—elimination of error—greater rigidity—all these are yours in this new device.

*Send today for complete information.*

**Hartford Special Machinery Co.**
**285 Homestead Ave., Hartford, Conn.**


the rigidity of a double housing planer. The cross rail is extended and the "outboard" housing is movable.

Rail heads are of the heavy offset type with rapid traverse in all directions and electric friction feeds. Side heads are described as truly universal and of massive design.

Reversing motor driven machines are push button controlled from all positions. Pendant switches control table travel from both sides of machine. The small illustration shows push buttons at one end of rail. Duplicate controls are used at other end.

All Liberty planers can be furnished with variable voltage reversing direct current motor, constant voltage reversing d. c. motor, overhead motor drive, or countershaft drive.

New bulletins are available giving full details and specifications.

## Industrial Instrument Publication

Articles discussing use of instruments in industrial applications are featured in a new monthly house magazine launched last month.

The publication, "Wheelco Comments," in the current issue reports a 20 percent saving realized by one company following installation of control instruments, and gives other information of interest to users and prospective users of industrial instruments.

The current and succeeding issues may be obtained by addressing the Wheelco Instrument Co. at Harrison and Peoria Streets, Chicago.

**NUMBERALL**
**Numbering Machines**
*Automatic and Hand Operated*

for stamping in Metal, Fibre, Plastics, etc. Do faster and better work than Single Steel Stamps.

For Marking Metal Parts, Name Plates, Metal Checks, etc.

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**NUMBERALL STAMP & TOOL CO., Inc.**
Huguenot Park, - - - Staten Island, N. Y.

# TO SATISFY THE NEED

**OF LARGER**

MANUFACTURING FACILITIES
WE ANNOUNCE REMOVAL

**TO OUR NEW PLANT**

**- - OUR AIM - -**

BETTER SERVICE
TO INDUSTRY IN THIS
NATIONAL DEFENSE PROGRAM

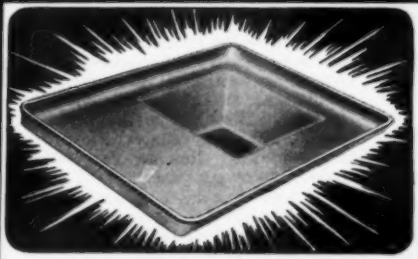
**OUR PRODUCTS**

MAGAZINE FEED POWER SCREW-DRIVERS
MOTORIZED HOPPER UNITS

**DETROIT POWER SCREWDRIVER CO.**

**2809 W. Fort St., Detroit, Mich.**

# LATHE PANS



**LITTLEFORD**

**LITTLEFORD BROS.**
**435 E. Pearl St.**
**Cincinnati, Ohio**

**Speed up your production by using precision made Lathe Pans delivered to your plant ready to install. Why tie up parts of your plant when you can secure low cost Pans made in a plant set up for this work. Any size or shape can be made with accuracy.**

***Send your blueprints for prices, today!***

*Mr. Machine Tool Manufacturer—*

# FlexoiD SPeed *Control Units*

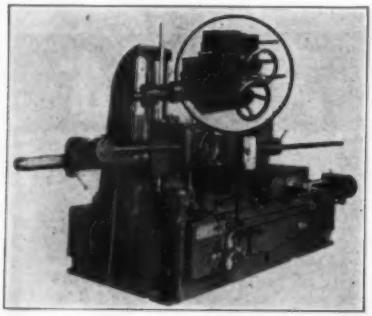
can be applied to your machine giving you an

**A1 Ready Made Speed Change Box**

The ease of replacing and interchanging these efficient and sturdy units means no holding up of production if repairs are necessary.

Shafts and gears are made of alloy hardened steel. The one piece shafts are solidly mounted at each end in ball bearings and operate in a continual bath of oil.

**4 and 8 Speed models are available**



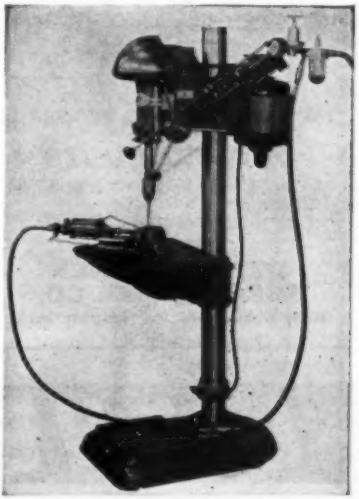
Shown above is the Yoder No. 3 horizontal boring mill, manufactured by the Yoder Co. of Cleveland, Ohio, equipped with two FlexoiD 8 SPeed Control Units installed as standard equipment.

PST *May we submit detailed facts and figures*

**The Smith Power Transmission Co.**
1545 E. 23rd St., Cleveland, Ohio

## Air Motor Adaptable to Many Operations

Production of the new Senacon air motor with "integral air valve" (patent applied for), for semi-automatic operation of drill presses, milling machines, air vises, jigs, special holding fixtures, etc., is announced.



The air valve mechanism of this unit has been designed to operate through regular movement of the machine tool operating lever, quill, table or the like. Its actuating lever can be adjusted to operate from any angle in any desired plane—making linkage connection to some regular moving part of the machine tool for semi-automatic operation extremely simple. It may also be operated by hand or foot when desired.

Exhaust air from the motor may be directed onto the fixture to clear it of and/or eject the work at end of operation.

The illustrated drill press attachments depict two typical applications of the motor, viz:—1. To a drill press feed, which on tripping automatically advances drill to a predetermined drill

awaiting replacement of the work. 2. To an air vise with control lever tied to the drill press quill for holding, releasing and ejecting the work piece in proper synchronism with movement of the drill.

With these two attachments the drill press operator need only drop a fresh piece of work into the empty holding fixture of the vise and trip the feed control lever to effect a complete drilling operation—thus permitting him to tend several vises at one time.

The Air Motor is available in two standard strokes, 1-⅛" and 2-½", with strokes up to 4 or 5 ft. being available on special order.

Address all inquiries to Smith-Johnson Corp., 1358 South Hill St., Los Angeles, Cal.

## Handbook of Sleeve Bearings

The Federal-Mogul Corp. announces a "Handbook Of Sleeve Bearings," by Albert B. Willi, Chief Engineer. It is said to be the only work of its kind available.

It discusses the effect of design, alloys and manufacturing methods upon sleeve bearing efficiency, and defines the field of application for each basic type of sleeve bearing. It contains information for engineers, designers, and draftsmen which will serve as a guide to bearing design and selection.

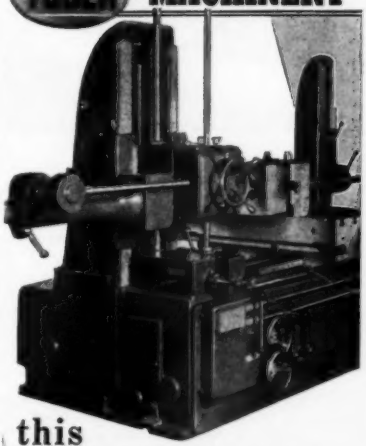
One of its most valuable uses is as a reference, especially the section which lists innumerable sizes and types of bearings and bushings for which major manufacturing tools are now available.

This makes it possible for engineers and designers to obtain custom-built bearings for new or improved applications, without paying the premium this ordinarily entails. In many cases the major tools are already available, and the bearing or bushing can be produced with only minor costs for incidental tooling.

The "Handbook" is described as the result of long years of specialization in this field. It is available only to those who are directly concerned with sleeve bearing installations. Address Federal-Mogul Corp. Detroit, Mich.


Consistent with the High Quality of all

YODER MACHINERY



this

HORIZONTAL BORING MILL

Successfully meets the most exacting speed and accuracy requirements of the experienced operator, yet readily lends itself to a variety of work by young machinists or new trainees.

Adjustment dials are extremely legible and all controls are within unusually easy reach—one man can easily set up a large job. Milling cutters are easily attached to spindle flange.

No. 5 Morse Taper, 24-inch traverse of bar 24" x 48" Table. 16 Power Speeds for Head, Saddle and Table, in any direction.

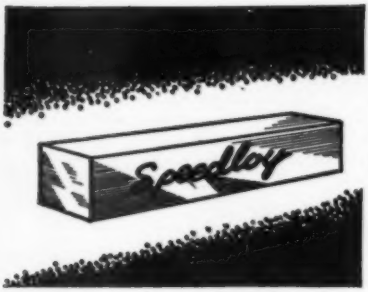
These with many other exceptional features combine to make a machine that will give a long service life with volume production of accurately machined parts. Write TODAY for Complete Information. Prompt Deliveries.

THE YODER SALES CO.

5500 WALWORTH AVENUE
CLEVELAND, OHIO

YODER ALSO MAKES:

Cutters, Uncoilers, Scrap Cutters, Slitting Lines, Tension Reels, Bending Machines, Beading Machines, Brake Shoe Machines, Roll-Forming and Flying-Cut-off Machines.




## WHAT IT IS

SPEEDLOY is a cast, cutting material made up of a special tungsten chromium alloy. It fills the breach between high speed steels and tungsten carbides in both performance and price.

## WHAT IT DOES

SPEEDLOY wears longer than high speed steel and resists shock more than tungsten carbides. It will machine all materials except manganese steel and chilled iron. It should be run faster with about the same depth of cut and feed as high speed steel—thus increasing production 25 to 75%.

SPEEDLOY has proven exceptionally effective on stainless and other nickel or chrome alloy steels.

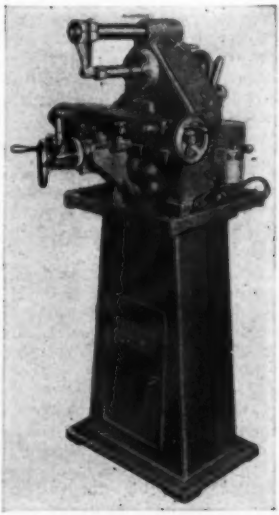
SPEEDLOY can be supplied in tool bits, flats, and a wide variety of tipped tools available for immediate delivery.

*LITERATURE ON REQUEST*

CIRCLE TIP TOOL CO.
EAST ORANGE NEW JERSEY

## Jefferson Announces "Bull-Dog" Precision Milling Machine

The new Jefferson motor-driven precision milling machine features rugged (Bull-Dog) construction and unusually large capacity, according to the makers. It is said to combine speedy and accurate production with ease of operation and long life. It is also reported to be especially useful for die sinking, contour profiling, angular milling, routing, etc.

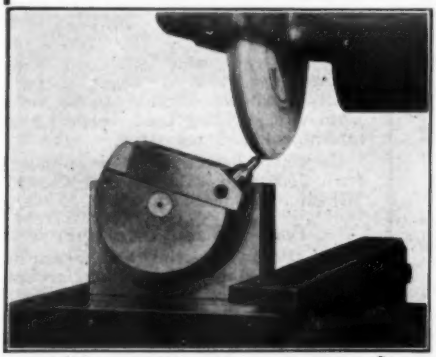


Described as both a tool room and production machine, the Jefferson precision milling machine is offered in both floor and bench models, with or without power feed. Quick acting hand lever feeds are also available.

The spindle of this new machine is mounted in Timken bearings; slides are dove-tailed, gibbed, and hand scraped; and gibs are adjustable for take-up in time of wear. There is a positive locking arrangement of table, knee, and saddle. Power feed (when included) has adjustable positive automatic stop.

## *Speedy!*

**The WELCH Quick Angle Dresser speeds up the accurate dressing of grinding wheels to any required angle. It is quick and easy to use . . . accurate and precise in the results obtained.**



## *Precise*

The WELCH Quick Angle Dresser is available in plain or vernier types. Revolving dial on the plain type is graduated in degrees and the zero line is on the base block.

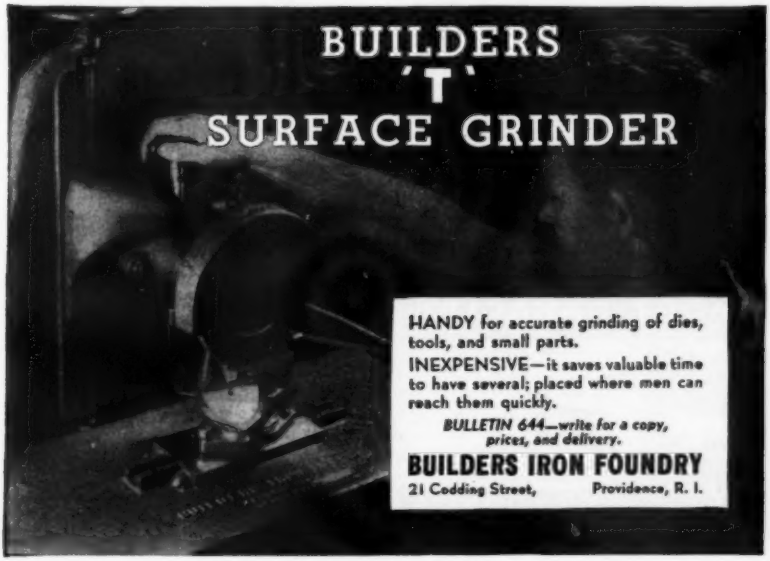
Vernier type has the same graduated revolving dial, with vernier cut into the base block. This is an unusual feature and precludes possibility of the vernier being moved.

After setting dresser to the required angle, tighten knurled hand knob and dresser is ready for use.

**Vernier type dresser, complete with one diamond** **$82.50**

*Write TODAY for full information and prices.*

**Welch Industries Incorporated**
Makers of HIGH SPEED MILLING CUTTERS
FORM TOOLS and SPECIAL TOOLS
**19900 W. Eight Mile Road**
**DETROIT, MICHIGAN**




HANDY for accurate grinding of dies, tools, and small parts.

INEXPENSIVE—it saves valuable time to have several; placed where men can reach them quickly.

*BULLETIN 644—write for a copy, prices, and delivery.*

**BUILDERS IRON FOUNDRY**
21 Codding Street, Providence, R. I.

**HANDMAG**

**Demagnetizer**
**AC Portable Type**

A low priced, highly efficient unit guaranteed to duplicate the performance of larger demagnetizers now on the market. Will last a lifetime. We invite comparison.

**Price $8.50**
F.O.B. Chicago

*Send check with order. We prepay the freight.*
*Territories Open for Dealers*

**Victor Machinery Company**
**130 So. Clinton St., Chicago, Ill.**

**ACCURATE RIGID SURFACE PLATES**

These particular surface plates are made of a high quality of close grained, stress annealed semi-steel type grey iron. Of extra rigid construction, they have a three point suspension and are designed for a minimum flexion with a high degree of precision and are adapted for use where extreme accuracy is required. They are manufactured in several sizes and deliveries are prompt. Write for full details.

**LOMBARD GOVERNOR CORP.**
**ASHLAND, MASS.**

LESLIE HAND PUNCH PRESS
**MOST CAPACITY**
POSITIVE ALIGNMENT

Max. cap. 2⅜ dia. hole thru 10 ga. iron, proper shear on punch, throat depth 6½. Takes punch press dies up to 3⅛x4¼ in area. Leaf arm gives perfect alignment without ways or leader pins. Portable.

*Ask your dealer, or write for circular.*

**LESLIE WELDING CO.**
2947 Carroll Ave. Chicago


Table has three standard T-slots. Feed screws have dials graduated in thousandths of an inch.

This new miller is equipped with 1/3 h.p., motor and V-belt drive. Spindle speeds of standard model are 400, 800, and 1200 r.p.m.

Working surface of table is 14"x43/8" with vertical motion to knee 53/4". Longitudinal feed is 7" and transverse feed 3".

Regular equipment includes a draw-in attachment and ½" collet. Attachments available include swivel vise, plain vise, dividing head, vertical head attachment, and tail-stock.

Complete details may be obtained from Jefferson Machine Tool Co., 700 W. 4th St., Cincinnati, Ohio.

## Pocket-Size Vibrometer

For use in detecting and measuring mechanical vibration in motors, generators, and other rotating machinery, a pocket-size vibrometer is described in a new leaflet.

Method of adjusting the vibrometer reed length to measure primary vibration frequencies and harmonics between 500 and 20,000 cycles per minute is described. Construction details discuss the clamping of the reed for adjustability, rigidity and response to machine vibrations.

Vibrometer specifications cover frequency range, sensitivity, amplification, and physical dimensions.

A copy of descriptive data 85-910 may be secured from department 7-N-20, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.


**ACROMARK** TRADEMARK **FAST**

*MARKING & NUMBERING MACHINES HELP YOU DO A GOOD MARKING JOB.*

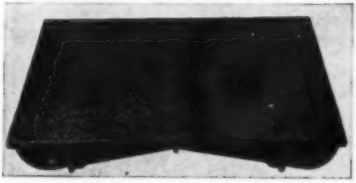
*Write for latest catalog.*

CONSULT OUR MARKING SPECIALISTS ABOUT ANY MARKING PROBLEM.

**THE ACROMARK CORPORATION**
**259 No. Broad St.**
**Elizabeth, N. J.**

## A New Surface Plate

An improved design of surface plates has been developed by the Machine Products Corp., Detroit, Mich.



According to the manufacturers, these surface plates resist deflection under load and retain their accuracy due to a special form of supporting ribbing. The sturdiness and rigidity essential to precision work is claimed to exist over the entire area of the surface from center to very edge. Ample clamping space is provided all around the edges.

The plate is made of a specially processed iron. A special heat treatment is given to relieve casting and machine strains. This is said to prevent distortion and changes from taking place after the surface has once been scraped.

Sizes range from 10x15 to 48x96", and are carried in stock ready for immediate shipment. Stands for the larger sized plates are available.

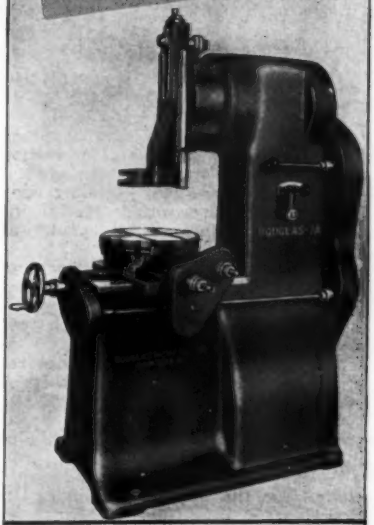
A complete line of angles and cubes made of the same material is also announced. These items possess the same high quality of workmanship found in the surface plates and are intended for use in the highest precision work in checking.


SAVE TIME when time is short

TOOL POST TURRETS FOR ALL LATHE SIZES
Handle up to 8 Tools—Saves on Repeat Operations
WRITE
C-W-C CORPORATION
HAWTHORNE, CALIFORNIA



DOUGLAS UNIVERSAL SLOTTERS



7½", 8½", 10" STROKE
Universal Adaptability by Swiveling Head, Automatic Rotary Table, High Speed and Accuracy.
QUICK DELIVERIES
DOUGLAS MCHY. CO., INC.
150 BROADWAY NEW YORK, N. Y.

# MACHINE TOOL Blue Book QUIZ

How much do you know about tool manufacturers and their products? You'll find the answers in Blue Book ads, or on page 261.

1—What tap and die firm is giving hints for tappers and other instruction in a series of advertisements?

2—What well-known grinding machine manufacturer offers special information on economical centerless grinding of small lots?

3—What companies offer heavy duty tool grinders with two independent tables and wheels?

4—What firm offers both bench type and portable honing machines?

5—What Ohio manufacturer has recently introduced a small, high-speed vertical milling machine?

6—What producer of hex-socket screws is featuring the mill distributor in current advertisements?

7—Which maker of die casting machines uses the trade name "Super Hi-Pressure"?

8—What is the name of the boring tool manufacturer whose advertisements have no illustrations and simply discuss their production and delivery problems?

9—What company is advertising ball bearing pillow blocks for service under severe conditions?

10—What firm makes "Chicago" Steel Press Brakes?

11—What milling attachment is available for milling, drilling, boring, or counterboring on any angle?

12—What company advertises that its bandsaw guides will overcome blade breakage?

13—Who is the maker of turning tools whose current advertisement uses a "Zero Hour" theme?

14—What precision grinder features interchangeable spindles for internal and external grinding?

15—What product is offered to "Rebore engine cylinders to factory-accuracy in one cut"?

16—What Company features "The Indestructible Drive" in connection with what product?

17—Who offers standardized taper arbors and adapters for all machines?

18—Quick deliveries are featured by what manufacturer of planers?

19—Wheels, knobs and handles—precision surface plates, angles and cubes are offered by whom?

20—What new portable coolant system is now available for the smaller machine tools?

21—Who features—"12 perfect files in every dozen?"

22—Tapping machines, flexible shaft machines and ground rotary files are offered by what Eastern Company?

23—What furnace manufacturer offers the "Electrothermic - Permeation Principle"?

24—"Circular relief grinding in one operation—one machine—one set-up" is featured by what Company.

25—What new drill makes possible the drilling of hardened steel?

## Eliminate Those Bottlenecks In Your Tool Room
## Install One Or More Oliver Die Making Machines

* * * * *

You can use less skilled mechanics and you will obtain better work in less time.

"A real time and money saver".

* * * * *

Every productive hour counts today so start in the tool room and on your production filing jobs to save 50 to 60% over hand methods.

*SEND FOR LITERATURE*

**OLIVER INSTRUMENT CO., 1408 Maumee St., Adrian, Michigan**

## *HIGH SPEED* FINISHING

**PEERLESS**
**HORIZONTAL OR VERTICAL**
**Surfacing Machines**

The horizontal machines are made in three sizes—9 inch, 14 inch and 20 inch, either with tight pulley for belt drive or extended base and direct motor drive.

Substantial bases and frames, dynamically balanced drums and self-aligning ball bearings assure smooth operation and freedom from vibration.

Sliding boxes which swivel on the adjusting screws enable the operator to adjust the abrasive belt easily and to change it quickly. Gauge and Dust Hood hinged to open quickly for belt removal.

We also manufacture the Reed Floor and Bench Drills, and Greenfield Universal Tool and Cutter Grinders.

**PRODUCTION MACHINE COMPANY**
**GREENFIELD MASSACHUSETTS**

## Facilitating Shell Inspection

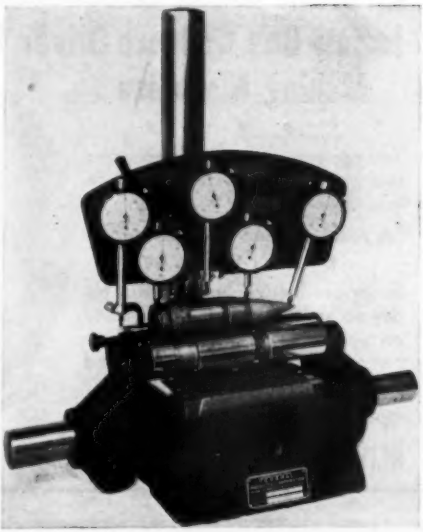
A new Model 100 B-15 Shell Gage for checking 37 MM anti-aircraft shells has been developed by Federal Products Corp., Providence, R. I.

In this particular case, four points are being inspected for diameters and concentricity and the fifth point is the concentricity of the fuse hole, with the outside diameter being inspected simultaneously, making five points in all.

Not only is it possible for the inspector to determine whether the shell dimensions meet the requirements or not, but he can also tell how far out imperfect shells may be and save parts for refinishing.

The shell rests on roller "V" blocks which can be rotated to compensate for wear. The shell is located laterally by an adjustable stop screw, as shown.

A gage of this same type can be made for shells of any size.

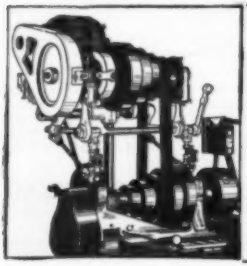


The gage is entirely mechanical and independent of all electrical or air line connections. The first cost of the gage is said to be lowest for multiple inspection gages of this character. Upkeep and interchangeability of Indicators is also claimed to be lower than that of electrical gages.

## Atlas Announces Drilling Machines

To step up production on small-hole drilling and tapping operations, a new series of two, three, and four-spindle drilling machines has been introduced by Atlas Press. The drilling heads of these machines incorporate the well-known ball bearing equipped floating drive featured in all Atlas heavy duty drill presses.

Table weight of the three and four-spindle Atlas machines is reported at 575 pounds, furnishing a solid support for the smooth movement of heavy jigs,

**Pick the drive that saves you most**

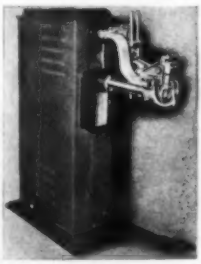
Learn how your present shaft driven tools may be Remco equipped at surprisingly low cost. Only drive with universal motor mounting—takes any motor of reasonable size—new or USED. Smaller h.p. motor used. Complete rigidity—no overhand—no strain. Complete line, for hack saws to 42" lathes, etc. Quickly applied. Write!—Remco Products Corp., State St. at R.R., York, Pennsylvania.

**REMCO MOTOR DRIVES**

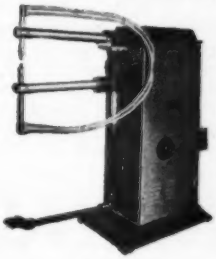
for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.

# HEAVY DUTY REX SPOT WELDERS

HERE IT IS



PROMPT DELIVERIES



At surprisingly low cost—The REX All Automatic Butt Welding Attachment.

For quick conversion of the REX or other spot welders of the rocker arm type—

Write for details and price.

The REX Spot Welders self contained steel cabinet units — Adjustable - swivel lower arm—Upper arm adjustable in and out.

Foot—air or motor operated—Rocker arm and press type design. 10 models.

Underwriters' approved.

Write for bulletin and price list

Dyer WELDER AND ENGINEERING Company

7 East 19th Street, Kansas City, Mo.

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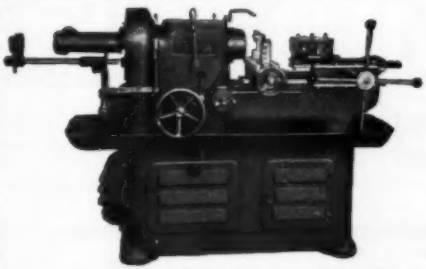
Morey



## No. 2G & No. 3 Turret Lathes

### Motor Drive Infinite Spindle Speeds

Any spindle speed you want—a direct reading dial shows when you've got it.

Permits the use of carbide tools for fast cutting.

Turret clamps and unclamps automatically.

Equally effective on second operation and chucking work.

| | No. 2G | No. 3 |
|---|---|---|
| SPEEDS from | 90 to 1800 R.P.M. or 180 to 3600 R.P.M. | 60 to 2100 R.P.M. or 100 to 3600 R.P.M. |
| CAPACITY | 1"x6½" turning length | 1½"x9" turning length |
| | Ask for Bulletin No. 629 | Ask for Bulletin No. 727 |

MOREY MACHINERY CO., INC.

410 Broome Street New York, N.Y.

fixtures and parts in production quantities. Each drilling head is equipped with its own motor mounting and a new type of positioning control with crank handle.

Condensed Specifications: — Number of spindles 2, 3, and 4; center distances between spindles 15", 18", and 13" respectively; table to Jacobs chucks 26", to No. 1 Morse tapers 24-¼"; column to center of spindle 7-½"; table surface (3 and 4 spindle machines) 21"x54";

spindle travel 4"; drilling heads SKF ball bearing equipped; motors recommended 1/3 or ½ h.p. 1740 r.p.m.; net weight less motors 1100 lb. (4 spindle machine). For complete description and specifications, write to Dept. 7, Atlas Press Co., Kalamazoo, Mich., and ask for Bulletin No. MS1. During 1941 Atlas is celebrating its 30th anniversary year.


RECOVER SCRAP QUICKLY with the TORNADO

Portable Industrial Vacuum Cleaner

Picks up chips, dust and even water. Cleans machines, walls, beams, floors, boiler tubes and tops, molds, etc. Powerful: 183 cu. ft. of air per min. Portable: weighs only 40 lbs. Dirt Capacity: 12 gal.

*Write for details and FREE TRIAL OFFER*

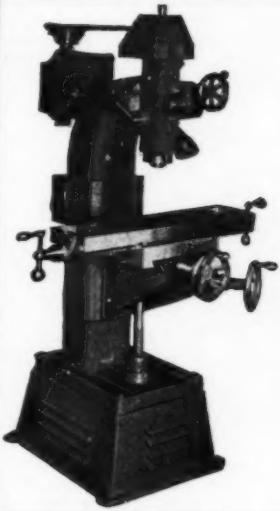
BREUER Electric Mfg. Co.

5118 N. Ravenswood Ave. Chicago, Illinois

## A New Sunnen Precision Honing Machine

The Model "MA" Precision Honing Machine is announced by the Sunnen Products Co., 7935 Manchester Ave., St. Louis, Mo. Designed for finishing holes

Micro Supreme
LAY-OUT DYE
PUT IT TO
YOUR OWN TESTS
FOR TOOL, DIE, PATTERN OR TEMPLATE LAYOUT ON METAL. A handy five-ounce can sent to you postpaid for . . . . . .
60¢
MICHIGAN CHROME & CHEMICAL CO.
6330 E. Jefferson Ave. • Detroit
SHARPLY DEFINED SCRIBED LINES



OUR PROMPT DELIVERIES ARE HELPING TO SPEED

THE DEFENSE PROGRAM

**JACKSON Vertical and Horizontal High Speed**

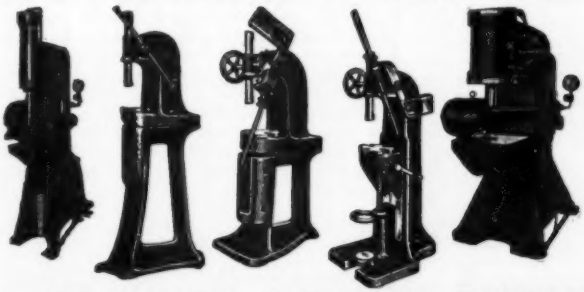
**MILLING MACHINES**

A new plant with increased facilities has made it possible for us to accept a limited number of orders for prompt shipment. High Grade in every respect and especially designed for High Speed Precision and Production Milling and Boring.

*Wire, Phone or Write*

**Jackson Machine & Tool Company Sales Division**
**JACKSON, MICHIGAN**

**For AIRCRAFT and MUNITIONS**



**1883**
**GREENERD**
**The Originators of the Arbor Press**
**1941**

**PRECISION WORK IN REARMAMENT**

**65 Standard Styles and Sizes. Manually operated presses ¼ to 35 tons pressure. Motor driven hydraulic presses 1½ to 30 tons pressure.**

***Let us send you our catalog No. F.***

**GREENERD ARBOR PRESSES**
NASHUA Est. 1883 NEW HAMPSHIRE

# PROMPT DELIVERY

DYER

## Heavy Duty Spot Welders

Dyer Welders are available in a wide range of sizes and capacities—air or foot operated, giving maximum production—simplicity of operation—power economy.

**Floor models 10 to 35 KVA.**

6 point selective switch on all floor models allows for quality welds on various materials. Standard and Underwriters Labeled Machines.

3 point switch on bench models.

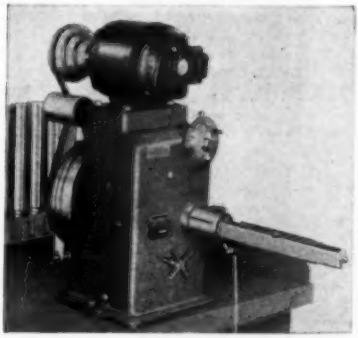
**Bench models 2½ to 10 KVA—with or without pedestal.**

***Few Territories Available.***

**The Topeka Foundry & Iron Works Co.**

**300-332 Jackson St., Topeka, Kansas**


from .185" to 2.400" in diameter, it is a bench-type machine. Work is held in the hands and located over a self-centering, rotating mandrel which contains a single abrasive stone.



Metal is removed by stroking the work back and forth across the full length of the rotating mandrel and stone. A pedal controls starting and stopping, feeds the stones out to the work, and holds it under pressure against the surface of the hole.

It is asserted that this useful machine produces super-smooth surface finishes and corrects out-of-roundness and taper produced by previous operations. It is also said to maintain alignment established by previous operation. This machine is claimed to provide "guaranteed accuracy" within .0001".

An attractive bulletin is offered describing the new Model "MA" honer in detail.


**ARMOR**

**MILLING MACHINE**

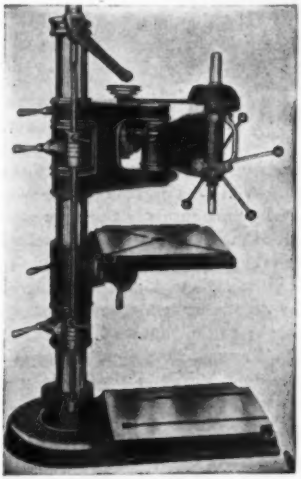
**Hydraulic or Hand feed at the turn of the wrist**

Vertical and Horizontal spindles. A standard machine equipped with drives to produce slow or high speed milling. Table feeds up to eight feet per minute.

***Write for Bulletin J9.***

**Aircraft Machinery Corp.**

Burbank, California



## MAKE YOUR DRILLING JOBS EASIER

**Increase Profits . . . Speed-up Production**
**End Worker Fatigue . . . Increase Efficiency**

***by using this***

## DRILLMASTER RADIAL DRILL

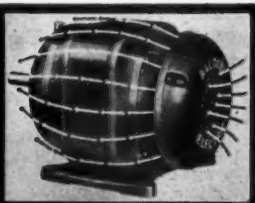
Economical in operating and first cost, this floor type, heavy duty, precicion-made, well-balanced Radial offers many features that merit your careful consideration. Drilling to the center of a 36" circle, No. 2 Morse Taper and heavy duty ½ HP ball bearing motor. The full floating, ball bearing spindle assures free and sensitive operation at all speeds.

***Send TODAY for bulletin giving full details.***

**Wm. C. Johnson & Sons Machinery Company**
**St. Louis, Missouri**

# NEWEST DESIGN

## *Cool-running* MOTOR



*Illustrating forced air-movement over entire exterior of motor frame.*

BALDOR Streamcooled Design provides a totally-enclosed, ball-bearing motor with an unfailing, NON-CLOGGING cooling system.
BALDOR Glass-insulated motors withstand higher temperatures SAFELY and provide MORE H.P. in smaller frame sizes.
These and many other features at NO EXTRA COST to you.

# BALDOR

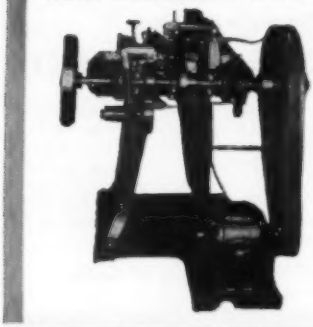
Write for Bulletin

**BALDOR ELECTRIC CO.**
4368 Duncan Ave., ST. LOUIS, MO.

**BETTER MOTORS**

# DESIGNED FOR HEAVY DUTY

## THE NILSON FOUR SLIDE MACHINE



For Swaging, Stamping, Piercing, Blanking, Forming of coiled metal. One of the outstanding features of this combination power press and four slide machine is the powerful and silent action of the main press slide which is operated by crank motion through toggle or knuckle joints. Strength and rigidity achieved by overhead stay rods. Changing dies is a simple and quick operation as the removable die set is easily accessible. The gripping members are independently operated, insuring a positive pull on long or short lengths direct from the reel.

*Write for further information.*

**The A. H. NILSON Machine Co.**

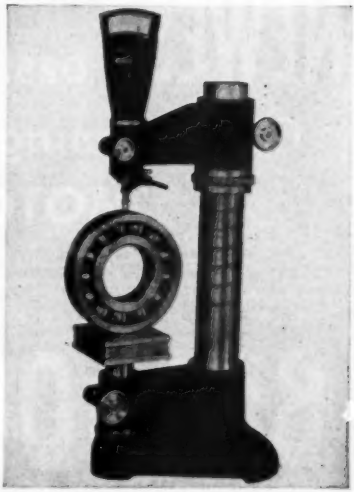
**BRIDGEPORT, CONN., U.S.A.**


### Heavy Duty Model 8 Comparitol

A new heavy duty model 8 Comparitol is designed especially to handle large and heavy precision work up to 8" in diameter.

It is a measuring and inspection instrument intended to eliminate the human element of "feel" and skill from the making of close tolerance inspections. A simple patented knife-edge lever system is used in the mechanism. The heavy duty model has a 2½" diameter column, extremely heavy holder bracket to support the measuring head and a 4"x4" hardened steel, accurately lapped table to handle large work. The base is very rigid and sturdy with three point contact for stability.

The instrument is being used to check and inspect plug gauges, bearings, pins, ball bearings and other parts and may be obtained with scale reading to .0001" or to .00005". It is claimed that the Comparitol is not affected by vibration and may be used under abnormal shop conditions even where

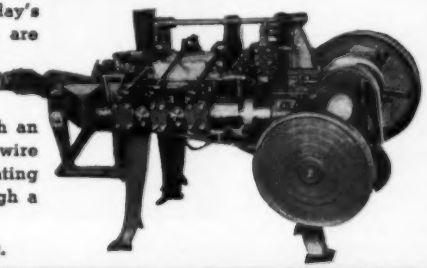


BUILT FOR SPEED-DURABILITY

THE NILSON-AUTOMATIC METAL AND WIRE FORMING MACHINE

The Nilson Automatic Metal and Wireforming machine meets today's industrial requirements. Here are some of the features of this machine. Open construction of press and forming tools. Patented slide feed with an independent cam-operated wire gripping device. Power operating wire feed is transmitted through a straight line.

*Write today for information.*



The A. H. NILSON Machine Co.
BRIDGEPORT, CONN., U.S.A.

there is shock from machinery or instability of floors. Illustration shows Comparitol measuring a bearing 6" in diameter to an accuracy of 1/10000". Further details may be obtained from the George Scherr Co., 122 Lafayette St., New York City.

## Quickwork-Whiting Bulletin

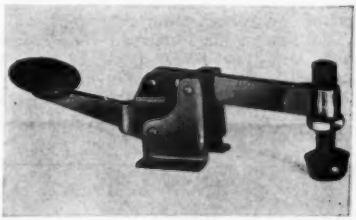
An attractive new 8-page bulletin just off the press, (Unit QW-102) describes the Quickwork-Whiting attachments for use with Quickwork shears. Details of a number of typical jobs are given, along with specifications and numerous illustrations.

Address Quickwork-Whiting Division, Whiting Corp., Harvey, Ill.

## Toggle Clamp for Aircraft Use

Model No. 830 Midget Toggle Clamp is announced by Knu-Vise, Inc., 206 Grove Ave., Detroit.

Furnished complete with spindle and rubber cap, measuring but 4"x1"½" high, it is said to provide a pressure



in excess of 500 lbs. Because of its small size and great holding strength, the Midget is ideally adapted to aircraft work.

The Knu-Vise line of Toggle action clamping fixtures now consists of 93 different models of clamps, pliers, plier-parallels, "C" clamps, riveters, and drill fixtures.

## New Turret Lathe by Oster

Designed with hand feed to cross slide and manually operated, a low cost motor driven No. 601 Turret Lathe, is announced by Oster Mfg. Co., 2036 E. 61st St., Cleveland, O. It is furnished with six position turret having six 1½" diameter tapped holes in each turret face for mounting various sizes of tool holders.

If the hexagon turret is not required, the machine is furnished with a plain saddle on which a variety of tool posts or other fixtures can be mounted.

Among the many operations performed by the machine are boring, reaming, threading, facing, and cutting off. It is asserted that less skilled operators may be used since many complicated features of design and operation have been eliminated.

Automatic chuck capacity is 1½" round bar; 1⅛" square bar; and 1-5/16" hex bar. Swing over bed is 14" and 6½" swing over cross slide. Carriage travel is 11" when there is a cross slide on the 33" main ways. Maximum movement of screw feed cross slide is 6½" and of lever feed cross slide 4½".

The machine is furnished with either worm drive or direct drive depending upon the required range of spindle speed. The worm drive is said to permit unusually heavy forming cuts with absence of chatter.

In the direct drive, for high speed work on small diameters and non-ferrous metals, the machine is equipped with a two-speed, 2 h.p. motor driving the spindle through triple V-belts. A range of spindle speeds up to 3000 r.p.m. is provided.

## Production Rivet Setting Machine

Development of a new type of "T-J" production rivet setting machine for powered riveting equipment is announced.

On this new Rivitor, pressure for setting the rivets is furnished by an air cylinder. Air pressure from this cylinder is applied (and stepped up)

*Why Not Buy The Original Electric Etcher?*

**MARK IRON AND STEEL**

**THE ETCHOGRAPH WAY**

New ELKONITE TIP pencil.
New Baby Grand Model at a lower price.

**2,000 in use**

**BREWSTER - SQUIRES CO.**

**42 Church St., New York, N. Y.**

# GOLCONDA DIAMOND TOOLS

## for Every Purpose

Golconda manufactures a complete line of Industrial Diamond Tools.

SINGLEPOINT tools have dependable forged or alloy settings which insure against diamonds working loose.

GOLCONE diamond points, cone shaped to 60°, 90° and 120°.

POLYPOINT tools have 3 or 7 solid diamonds symmetrically arranged in a special alloy setting for highest efficiency and lowest cost per dressing. POLYPOINTS do away with the big investment of large single point tools. Diamonds can be entirely used up—need no resetting. Use POLYPOINT tools and reduce loss due to costly accidents.

More than 18 years manufacturing experience will enable us to help you. Send for engineering help and write for folders.

*Immediate delivery on standard tools.*

**GOLCONDA DIAMOND PRODUCTS CORP.**

**2214 W. ARMITAGE AVE., CHICAGO, ILLINOIS**

**HALLOWELL** *DeLuxe*

## STEEL FOREMAN'S DESK

It's new . . . it's useful! And you'll find it popular in every corner of the shop for the safe keeping of records, etc. Many styles and models plus a wide variety of interchangeable drawer, cabinet and top units.

*You'll like the prices, too . . . write today!*

**STANDARD PRESSED STEEL CO.**

**Box 559, Jenkintown, Pa.**

Fig. 1740

**MOREY VERTICAL SHAPERS**

8" Stroke
12" Stroke

Accurate — simple for toolroom manufacturing. Self-contained motor drive.

*Ask for Circular No. 726*

**Morey Machinery Co., Inc.**
410 Broome Street, New York N. Y.

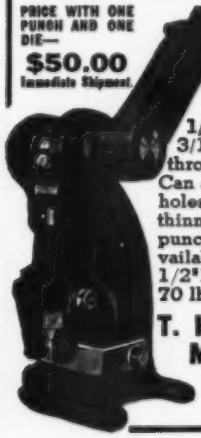


**T. H. L. FRONT LEVER**

**BENCH PUNCH**

Built for hard, tough work — die cannot lose alignment with punch — all parts interchangeable.

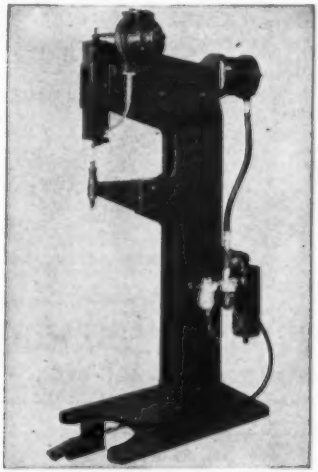
PRICE WITH ONE PUNCH AND ONE DIE—
**$50.00**
Immediate Shipment



Capacity — 1/2" holes through 3/16" steel; 13/32" through 1/4" steel. Can also be made for holes up to 7/8" in thinner metal. Stock punches and dies available from 1/16 to 1/2" by 64ths. Weight, 70 lbs.

**T. H. Lewthwaite Machine Co.**
*(Est. 1890)*
311 E. 47th St., NEW YORK


through a toggle mechanism. This familiar "air squeeze" action is combined on this machine with the automatic feed feature which heretofore has been confined principally to electrically powered riveting equipment.



In addition, by using a different type of rivet set and rivet jaw construction, these machines are said to do an excellent job of flush riveting.

The machine is capable of setting up to ¼" dia. x ¾" long aluminum alloy rivets. Tooling designs in some cases do not permit setting the longer length rivets, in which case the length is subject to limitation by the required tooling design.

These Rivitors are available in 9, 12, 14, 16, 18, 20, 22, 24, 28, 30, 32 and 36" throat depths. The ram stroke is 3".

The machine is equipped with a 6" diameter air cylinder. Recommended air pressure is 60 pounds pressure per square inch. Less pressure than this may be used depending on size of rivet being set.

Address The Tomkins-Johnson Co., 605 N. Mechanic St., Jackson, Mich., for further details.

# MORE MAN-HOURS WORKING UNDER BETTER CONDITIONS

## "UTILITY" GRINDERS
### MOTOR-IN-HEAD

***with self-contained dust collector***

Ball bearing; totally enclosed motors; adjustable tool rests and wheel guards; lift-out water pot. Starts instantly to full speed.

*Get details today.*

MODEL 500

THE UNITED STATES ELECTRICAL TOOL CO.

CINCINNATI, OHIO, U.S.A.

# "MORE THAN SATISFACTORY"

## 90% of All Cutting-off Troubles Eliminated by Luers Blades and Holders

When a nationally known manufacturer of aviation instruments says "Luers cutting-off blades and holders are more than satisfactory, meet our requirements in every way and are better than any we ever used", it's time for you to investigate.

Excessive friction causes most cutting-off troubles. Luers blades are tapered, providing adequate, frictionless back clearance. They are "T" shaped, thus reducing side friction. They cut a curved chip that expands without blocking the cut.

Tell us what automatic or hand screw machines you use.

Produced under license issued by John Milton Luers Patents, Inc.

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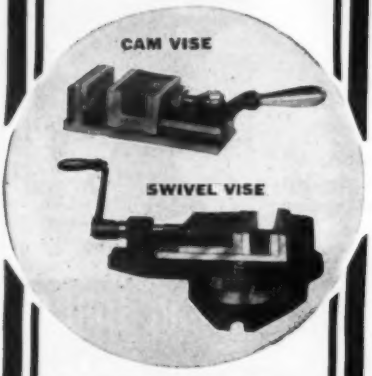
**EMPIRE TOOL CO.** 8790 GRINNELL AVE. DETROIT, MICHIGAN

# "MODERN" VISES




"MODERN" VISES are precision-built with hardened and ground jaws for rapid production work on milling machines, shapers and drill presses.

CAM VISES—Jaw Dimensions: width 4" or 5", depth 1½", maximum openings 2" or 3".

SWIVEL VISES—Jaw Dimensions: width 4", depth 1½", maximum opening 3". Can be used without base.

*Write for folders.*

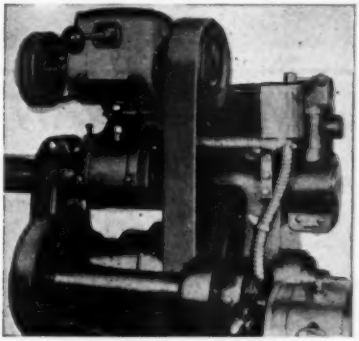
**MODERN TOOLS,**
**EAST BERLIN CONN.**

*Manufacturers of precision high speed steel and carbide cutting tools.*


## Western Transmission Made More Compact

A new Western Master transmission for use in motorizing cone-driven machine tools is announced by Western Mfg. Co., 3428 Scotten Ave., Detroit.

It is explained that through streamlining; a more compact unit has been accomplished - and with shifting lever moved into main body of the transmission, more direct and positive action is provided. This model is designed for use with 1-5 h.p. motors. Like the former Master and its companion the Major for 5-10 h.p. motors, it is adapted to all kinds of machine tools with three models of multi-motor mounting:—1. Lathe bracket, also for motorizing automatics, bolt cutters, Fellows gear shapers, vertical milling machines, radial drills, turret lathes, screw machines, etc. 2. Shaper bracket also for boring mills, vertical mills, etc. 3. Milling machine bracket.



Transmission case and covers are of semi-steel castings. Gears and spline shafts are of alloy steel, accurately machined, heat treated and ground. The gears are lapped. Revolving shafts are mounted on anti-friction bearings. All moving parts run in an oil bath—plugs are provided for filling and draining. Oil-seals are provided where necessary.

## Sheet and Strip Calculator

Dayton Rogers Mfg., Co., 2830 13th Ave., So., Minneapolis, Minn., announce

ALUMINUM CO. * ALLIS CHALMERS * MORTON SALT * WARD LEONARD * CUTLER HAMMER. * REYNOLDS TOBACCO * BABCOCK & WILCOX * REMINGTON ARMS STUDEBAKER * DUPONT * GOODRICH * NEW DEPARTURE * HYATT TOLEDO SCALE * KOHLER * FORD ARSENAL * DELCO-REMY * DE LAVAL, LTD. * AVIATION * AGFA ANSCO HAYS CORP. * WESTERN ELECTRIC * GENERAL REGULATOR * U. S. NAVY * LIBBEY-OWENS-FORD * CHAMPION SPARK PLUG * ELECTRIC AUTOLITE * LINK-BELT * ZENITH * BAUER & SCHWARTZ * OWENS ILLINOIS GLASS * U. S. CHEMICAL * ALLOYD * LEEDS & NORTHRUP BARRY WEHMILLER MACHINERY * WELDING * BURNING FIBERGLAS * CAMERON CAN MACHINE CO. * COMBUSTION ENGINEERING * BRASSERT & CO. * CREAMERY PACKAGE * ENERGY ELEVATOR * R. HOE & CO. * HERCULES POWDER * HEYDON CHEMICAL CORP. * SPENCER TURBINE * U. S. SIGNAL CORPS * BLISS KANOWITZ * LIGHT * OPTICAL * HARVEY COMPRESSOR * [illegible] FURNACE * MATHEWS CONVEYOR * AMERICAN OPTICAL * FOOTE-BURTE MACHINE CO. * INTERNATIONAL SILVER * STEARNS ROGERS * STACKPOLE CARBON RUSTLESS IRON & STEEL * PERMUTIT CO. * FAIREY MFG. CO. * AMERICAN VISCOSE * CONVEYORS * AMERICAN LAVA CO. * GOODYEAR AVIATION PHOTO ELECTRIC PILOT * NATIONAL CARBON CO. * OLSON RUG CO. * SCHULZE BAKING CO. * INTERNATIONAL FILTER CO. * PACKARD MOTOR * VULTEE AIRCRAFT

**LARGE and SMALL THEY all INSTALL**

***Janette Speed Reducers***

Janette Manufacturing Company
556-558 West Monroe Street Chicago, Ill. U.S.A.

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# IN GOVERNMENT SERVICE

***and private industry — everywhere***

**This holder has the same concentric alignment feature which has made other ALCO tools first choice.**

**Easy and quick set-up.**
**No thread inspection necessary.**
**Simple adjustment — dies securely held.**
**Floating feature does away with taper threads.**
**Large openings for proper lubrication and chip elimination.**
**ALCO accuracy will give longer life — accurate alignment assures uniform wear.**

ALCO EFFICIENT TOOLS

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THE ALCO TOOL COMPANY
835 HOUSATONIC AVE. BRIDGEPORT CONN.
DETROIT OFFICE: — 908 STEPHENSON BLDG.

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| No. | Each |
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| 601—10"x16"x6"—18 ga. - - | $ .95 |
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IMMEDIATE SHIPMENT

An excellent all-purpose shop box. Sturdy all-welded construction. Heavy skids act as a

POSITIVE STACKING LOCK

and re-inforce box at point of maximum wear.

**American Metal Works, Inc.**
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*For* **VIBRATION-PROOF FASTENINGS**

*on any mechanical or electrical equipment . . .*

Resilient non-metallic locking collar automatically eliminates thread play and holds threads in constant pressure-contact.

CATALOG contains a graphic explanation of the Elastic Stop principle, presents test and application data, and lists the complete line of nuts. • Write for a copy.

**ELASTIC STOP NUT CORPORATION**
2325 VAUXHALL ROAD • UNION, NEW JERSEY

Elastic Stop SELF-LOCKING NUTS


a new, revised and improved sheet and strip weight calculator. This handy pocket slide rule is designed to give the correct weight of any sheet or strip stock relative to the piece part weight in connection with all sheet metal requirements. While the slide rule is primarily laid out for all strip and sheet steel, there is an automatic conversion table for such materials as aluminum, copper, bronze, and other sheet alloys. The piece part weight is instantly recorded after knowing the weight of the stock, including thickness, together with the length required. It will calculate sheets in width from ⅛" to 96" wide, in thicknesses from .002" to 1" thick, and in lengths from ¼" to 1,000 feet.

The new device is handy for the calculation of weights on all materials used in the average punch press department and is offered for free distribution on receipt of request on a company's letterhead.

## A Slide Rule that Adds, Subtracts, and Converts

The new Sum-Up Plus and Minus Slide Rule is described as an aid to making and checking calculations for mechanical drawings, laying out machine-shop jobs, making patterns, etc. Unlike the usual slide rule which multiplies and divides the Sum-Up Slide Rule adds, subtracts and converts decimals of an inch, fractions of an inch and millimeters interchangeably. The answer can be read in fractions, decimals and millimeters. This rule is made by the Sum-Up Slide Rule Co., 114 Liberty St., New York.


**POSTEL FILING MACHINE**

Files faster than by hand. Built to do heavy filing or precision work. Proven dependable in 34 shops and guaranteed by us. Get full information. *Write for a bulletin.*

*(Agents Wanted)*

**Postel Filing Machine Co.**
915 Washington Ave.
Minneapolis, Minn.

## Dust Collector Easy to Install

Rapidity of installation, compactness, and long life as a result of low motor speeds are claimed as features of a self-contained, portable dust collector, announced by Aget-Detroit Mfg. Co., 964 Book Bldg., Detroit, Mich.

The "Dustkop" is furnished with flexible metal hose and two exhaust intake hoods, quickly attached to almost any portable type bench grinder. Known as Model "PM 100", this unit employs a 1/6th h. p., 110 volt, split phase motor to develop over 260 cu. ft. per min., air intake capacity, supplying sufficient suction it is said, to exhaust small wheel bench grinders, surface grinders and tool grinders, when unit is placed in close proximity.

About one square foot of space is needed for the unit itself. Assembly and installation of unit, hose, and hoods, requires no tools. The flexible metal hose permits installation of the wheel hoods at the most desirable angle with respect to wheel and present guard. Filter is of spun glass. The dust drops back into removable pan for periodic removal.

## G & S Vertical Mill and Jig Borer

A No. 0 Vertical Milling Machine and Jig Borer is announced by General Machinery Corp., 140 Federal St., Boston, Mass. With a maximum distance table to spindle of 9", it is designed to do the many milling, boring, facing,


Longer life for CARBIDE TIPPED TOOLS

*with this wet or dry*

STANDARD GRINDER

This substantial precision grinder provides great economy by removing less metal from carbide tipped tools and gives keener edge in less time.

While each wheel is equipped with wet grinding attachment, a separate toggle switch operates motor driven pump permitting dry grinding. Drum reversing switch included. Manufactured in three sizes: 1 HP for 10" wheels; 2 HP 1750 RPM Motor for 12" diameter cup or steel back cylindrical wheels; 3 HP 1150 RPM Motor.

*Write for Catalog 43.*

The STANDARD ELECTRICAL TOOL Co.
CINCINNATI, OHIO
WEST EIGHTH ST.

for Army and Navy Parts

MADISON-KIPP

hi-high pressure

ALUMINUM DIE CASTINGS

We are handling orders for millions of die castings, difficult castings and vital parts for nearly all branches of U. S. defense and U. S. aid efforts. (Many of the parts were originated as die castings at Madison-Kipp). The hi-high pressure casting process completely obsoleted older methods of casting Aluminum. When Aluminum again becomes available for non-defense articles, there will be a swing to this "Lighter—Stronger—Cheaper" metal.

AND

HIGH SPEED

KIPP air TOOLS

Kipp Air Tools give you highest speeds, lowest prices and have proved indispensable in thousands of tool rooms and production departments. Free trial permits any concern with a satisfactory credit rating to try any Kipp Air Tool for ten days. Grinders sell from $9.75 to $58.75. Chippers and Filers at $19.75.

MADISON-KIPP CORP.

207 WAUBESA ST., MADISON, WIS.

and routing operations that are performed in tool, die, and machine shops. Also it should be useful in making small parts for instruments, arms, munitions, etc.

Described as a precision tool, its spindle is SAE 4150 steel, heat treated, with 6 splines on driving end. Spindle is mounted on ball bearings with five speeds available. A ½ h. p. motor is included as standard equipment.

A hole through spindle permits use of a draw bolt for holding and tightening collets in spindle nose. Collets up to ½" may be used.

A hand wheel effects spindle movement and features a micrometer collar. Maximum feed is 4". Cross feed and table traverse wheels also read to thousandths of an inch. A spacer block is available which increases space between table and spindle.

This G & S Miller features a table 6"x16". Table has longitudinal travel of 8½" and cross travel of 7".

Overall height of pedestal type machine is 54". A bench model measures 29" with spindle up. The floor machine requires space 18"x22".

# ARE YOU BAFFLED BY A SEALING PROBLEM . . ?

If you are faced with a perplexing seal job, Acme Industrial Company offers the aid of trained engineers who specialize in solving the most involved sealing problems.

Your product may include rotating seals that must retain fluids and gases. These, of course, must be properly sealed, not only to prevent costly leakage, but to forbid entrance of foreign particles.

Acme does exactly that . . . and more. The Acme method of lapping the surfaces, provides seals that are initially tight . . . that stay tight indefinitely. Their strict uniformity cuts original assembly expense and practically eliminates re-assembly and re-testing costs.

**Move Your Lapping to the Acme Plant !**

Conserve space. Release skilled help for other important duties. Transfer your lapping and sealing jobs to the Acme plant. Your blueprint or complete seal in our hands will bring back valuable suggestions . . . will convince you that Acme service can form a lasting allegiance between your engineering and production departments and ours. *Write.*

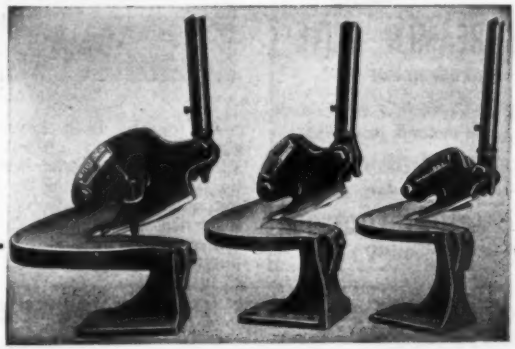
*ACME ADVICE IS YOURS FOR THE ASKING*

## ACME INDUSTRIAL COMPANY

*Specialists in Flat and Cylindrical Lapping*

**210 N. Laflin St., Chicago, Ill., MONroe 4122**

**Cuts Intricate and Straight**



**Cuts Circular and Irregular**

## SPEED-UP the job with BEVERLY Throatless SHEARS

Just the thing to speed-up those vital Defense Orders! Cuts metal any shape with hair-line accuracy! No distortion! Precision workmanship and finest steel make BEVERLY last a lifetime! Investigate these efficient bench-type shears, today!

**Made in 3 Sizes**

No. 1 — cuts 14 gauge — wt. 16½ lbs.
No. 2 — cuts 10 gauge — wt. 33 lbs.
No. 3 — (Equipped with ball bearing hold-down device) cuts 3/16 inch mild steel or 10 gauge stainless — wt. 55 lbs.

**BEVERLY SHEAR CO., 3005 W. 110th PLACE CHICAGO, ILLINOIS**

**"ALNOR" Velometer**
**An All Purpose Air Velocity Meter**
**—Instantaneous, Direct Reading.**

Measures total and static pressures as well as velocities.

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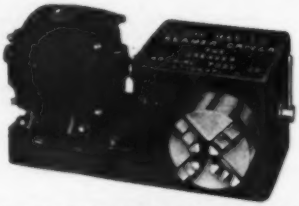
**ILLINOIS Testing Laboratories, Inc.**
150 W. Hubbard, Chicago

**Only $138.50 Buys This**



**GREAVES REAMER DRIVE**

- Cuts reaming time in half
- Assures smooth, accurate holes
- Complete with motor & foot switch
- Capacity up to 1½"

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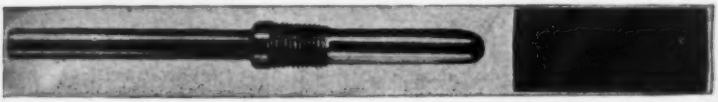
**GREAVES MACHINE TOOL CO.**
CINCINNATI, OHIO

## Packard "Shaves"

Upsetting tradition in the manufacture of aircraft engines, Packard Motor Car Co. has adapted automotive mass-production methods to finishing of

gears for the Rolls-Royce Merlin engine. A battery of automotive type Michigan rotary gear shavers is ready for finishing gears for the Merlin, proving once more that the most rigid of tolerance specifications are no bar to the employment of high-output production methods.

**FLEXIBLE ABRASIVE WHEELS**



Designed for precision work where flexibility is required, these wheels are useful accessories for sanding and finishing regular and irregular jobs, penetrating into difficult recesses, lapping holes in dies, finishing various shapes of metal, wood, rubber and plastic parts.

Useful for finishing propellers in aircraft construction. Descriptive bulletin and sample wheel will be sent on request.

**FIELD ABRASIVE SPECIALTY MFG. CO.**
203 LOWE BLDG., DAYTON, OHIO

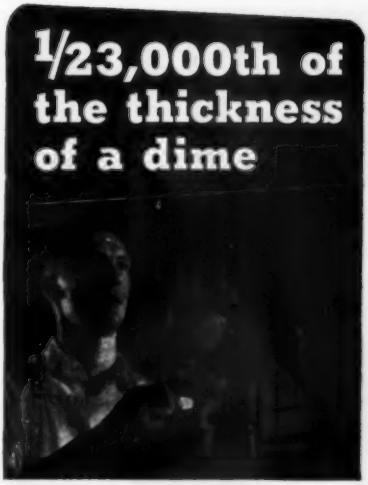
## Hammond "10" Carbide Tool Grinder

A new 10" carbide tool grinder combining facilities for straight wheel peripheral and cup wheel face grinding has been added to the line manufactured by Hammond Machinery Builders, Inc., 1614 Douglas Ave., Kalamazoo, Mich.

Work tables on the new grinder tilt from 0° (at level) to 25° . . . each degree of tilt accurately measured by a scale mounted below. Both tables slide

easily to any point of adjustment on machined ways, locking in selected position. Tables are slotted to accommodate protractor angle-guide furnished with machine and are grooved to keep working surface free from grit and dirt. Table on right is mounted on a heavy supporting shaft, directly over a casting which serves as a sludge pan. Releasing one simple clamp, the entire unit may be removed from the shaft, permitting cleaning of sludge pan or replacement of wheels.

For wet grinding with diamond cup wheel, right side of machine can be fitted with a reservoir mounted directly over wheel on cast-iron guard. Drip-feed of moisture to diamond wheel is controlled by a needle valve. Can also be furnished with cup wheel assembly on both sides.


IMAGINE slicing a new dime 23,000 times. Each sliver would measure approximately two-millionths of an inch *thin*. There are Johansson Gage Blocks which are accurate within two-millionths of an inch! Small wonder that Johansson Gage Blocks and Accessories are regarded as a prerequisite for accuracy in much defense production.

FORD MOTOR COMPANY

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Division
(Dept. C)
Dearborn,
Michigan

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GAGE BLOCKS

DIG USA BIGHED EST 1860
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CHICAGO ILL. Phone Atl. 1095
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LONG. DIS. ENTERPRISE 5959
Special Resetting Service TO OUR CUSTOMERS

Spindle or arbor is oversize, of chrome nickel steel, mounted on four pre-loaded precision ball bearings. On standard models, spindle turns up 2100 r.p.m.

Power is supplied by adjustable V-belts driven by a powerful 1 h.p. electric motor (reversant for right or left hand grinding) with a speed of 1750 r.p.m. Control is by built-in switch positioned conveniently at front.

Base or frame is a heavy, vibrationless casting with convenient opening in back permitting easy access to motor. Machine tool construction characterizes the grinder throughout. Overall height, floor to center of spindle, is 38"; size at base, 15"x18".

Prices and more complete information will be furnished by manufacturer to persons requesting Bulletin GP-3.

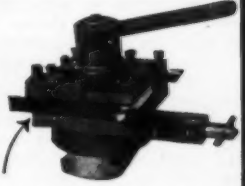
THE SHAPE-RITE HY-DUTY 8"
STROKE PRECISION SHAPER
is furnished with table support, helical gears, Vee-ram, and anti-friction bearings throughout.
For defense work this shaper is unexcelled. Small parts are handled with greater speed and accuracy due to its rigidity.
Sales Service & Mfg. Co.
473 N. Cleveland St. Paul, Minn.

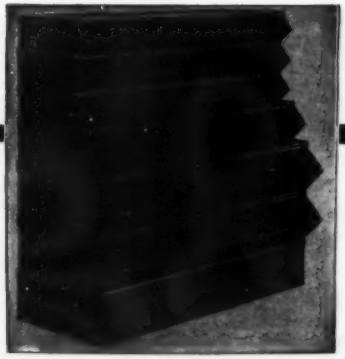
## Thor "Aircraft" Drills

Extremely light in weight and claimed to develop approximately twice the power of conventional production-duty electric drills, a new U14FS series—¼" "Aircraft" Drills—is announced.

Particularly useful for operation in very limited space or in unusually difficult positions, these U14FS drills are asserted to have the power reserve and construction ruggedness necessary for high speed production. Of small size and compact design, they are available in three different speeds and have side switch style handles for either continuous or intermittent drilling.

For further information address the Independent Pneumatic Tool Co., 612 W. Jackson Blvd., Chicago, Ill.

**Helping On Defense Work**
by
**Speeding Up Lathe Production On Repeat Operations.**
**80% of the turrets we have sold since 1938 are now being used on Defense Work.**
Carries four standard tools including cutting-off tool. Note the simple but effective way in which cutting-off tool is employed.

*Will quickly liquidate its cost.*
**S. G. COLWELL, 25 Congress Ave., Providence, R. I.**



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### —Wherever You Need Them!

STACKBIN sections will give you a Stockroom wherever you want it—quickly and easily as building a sectional bookcase. These patented sectional storage bins nest together without the use of tools—cost you nothing to build, nothing to move. Find out today how STACKBINS can lower YOUR handling costs.

Write to
STACKBIN CORPORATION,
55 Troy St., Providence, R. I.

**STACKBINS**
"STACKED AND STILL ACCESSIBLE"

## Whitney Lever Punches Pay Their Way

No. 8-B

No. 2

CHANNEL

Because of their power, capacity, simple construction and fine balance, you will be able to do more punching. Because all main parts are drop-forgings of high grade alloy steel with wearing parts heat treated, these punches last longer.

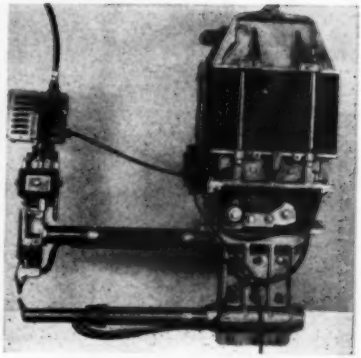
The W. A. Whitney No. 8B Punch shown at left makes a ¼" hole in ⅛" iron. The No. 2 punches a 5/16" hole in ¼" iron. Its companion, the Channel Iron Punch—¼" hole in ¼" iron.

*Let us send you our catalog showing the complete line.*

**W. A. WHITNEY MFG. CO.**
ROCKFORD, ILLINOIS

## Portable Welding Machines

A line of 'portable' welding machines, with built-in transformers designed for suspension from monorails, etc., is announced by Progressive Welder Co. While they may be used for much of the work now done on pedestal welders, they have particular advantages in such applications as:



1. Spot welding of large units requiring clearance from the ground under welding arms, or of heavy units.

2. Spot welding of parts on a conveyor.

3. Spot welding assemblies in several jigs in one department, requiring movement of welding equipment.

4. Pinch welding of spots not easily accessible with gun type welders due to throat limitations.

5. Jobs which can be handled most effectively by a unit suspended from a swinging or traveling crane.

In effect, the new welding machines are a cross between "pedestal" and gun welders. Like welding guns they may be moved or swung around to bring the gun to the work, reducing work handling. Like pedestal welders they have rigid arms with a high degree of


Lewis Semi-Finished

**BENCH MILL**

**A PRECISION MILL AT A SENSIBLE PRICE !**

Ideal for many uses. All major machining operations finished to high degree of accuracy. Perfectly designed, shop-tested, trouble-proof construction. Exceptionally efficient. Stands severest service. Handles full range milling work. Table 3⅜"x18", travel 12", cross feed 5½", vertical 7". No. 3 Morse Taper in spindle. ¾" center hole adaptable for collet attachment. Complete — including materials, blueprints and LEWIS COUNTERSHAFT castings.

*Send today for new 1942 Catalog.*

**LEWIS MACHINE TOOL COMPANY**

P.O. Box 116, Sta. A, Dept. Z-11 Los Angeles, Cal.



CLOSED TRADE AUTOM MARK CLOSED

Plain Type Offset Type

OPEN OPEN

**CONTINUOUS HINGES**

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

**AUTO MOULDING & MFG. CO.**

2326 S. CANAL ST
CHICAGO

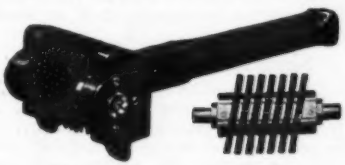
*SPECIFICATIONS:*
*Open Width* ⅛" to 6"
*Gage Material* .040 to .125
*Pin Diameter* .101 to ⅜
*Lengths to* 120"

THREE-FOURTHS OFFSET. SEMI-OFFSET

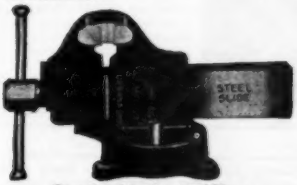
# GRINDING WHEEL DRESSERS—VISES

We manufacture the only complete line of Grinding Wheel Dressers and cutters and will gladly suggest the proper one for your wheels.

The exclusive solid steel slide makes Simplex Vises stronger and more serviceable.



Desmond Heavy-Duty Dresser



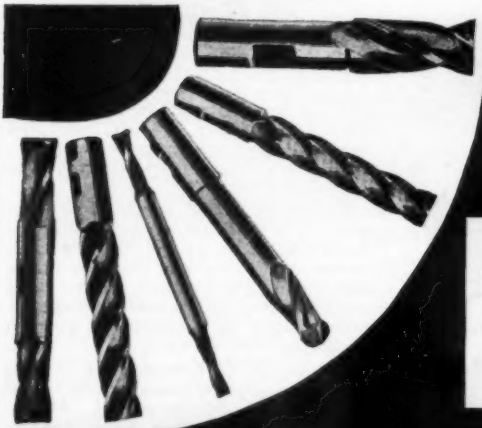

Simplex Machinists' Vise

Desmond Diamo-Carbo Dresser, best tool room dresser.

*Write for catalog H showing complete line of Desmond Dressers and Simplex Vises and name of your nearest dealer.*

**DESMOND-STEPHAN MFG. CO., URBANA, OHIO**

**Canadian Desmond-Stephan Mfg. Co., Ltd.—Hamilton, Ont.**



*Shear Cut—High Speed*

# END MILLS

**Shear Cut End Mills are offered in all standard sizes, single and double end.**

***Write for catalog and prices today.***

**PROGRESSIVE TOOL & CUTTER CO.**

**2345 WOLCOTT ST., FERNDALE, MICHIGAN**

**THE PRECISION UNIVERSAL TOOL HEAD**

brings all adjustments under absolute micrometric control of the operator without stopping tool or machine. In Jig Borer, Milling Machine or Horizontal Boring Mill, it bores, faces, counterbores, turns outside diameters, mills flat surfaces and slots, under-cuts, recesses, back-faces and does an almost limitless range of "headache" jobs. Send for bulletins. Address all communications, inquiries and orders to

THE PRECISION TOOL COMPANY
P. O. BOX 155, BROOKLYN, NEW YORK
Cable Address: "Pretool-New York" Tel: MAin 4-1064

**Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS**

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

*Write for Circular*

NIELSEN TOOL & DIE COMPANY
1839 Gardner Ave.
Berkley, Mich.

BUY WHITNEY-JENSEN
METAL-WORKING MACHINERY and HAND TOOLS
for LONG LIFE and ACCURACY

12-14-16 ga. 4-5-6-8-10 ft. sizes

**ROLLER BEARING BRAKES**

Combination type, for box and pan as well as all types of straight bending. 30% easier on the operator. Hardened jaws for stainless steel.

**OVER 80 USEFUL ITEMS**

in the Whitney-Jensen line. Punches, shears, brakes, rolling machines, etc. *Send for new Catalog No. 14.*

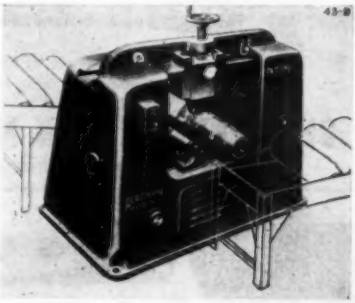
WHITNEY METAL TOOL COMPANY
114 FORBES STREET • ROCKFORD, ILLINOIS

throat depth, and the higher degree of efficiency going with the eliminating of secondary cables.

Lower in cost than pedestal welders, the new machines are obtainable in a complete range of sizes from 35 to 400 KVA, and with arm lengths ranging up to a practical maximum of 36" of throat depth.

## Shell Marker by Acromark

High production shell marking is the purpose of the new Acromark No. 15. It utilizes the principle of a shaper, incorporating the entire mechanical construction within its ample cast iron housing.



Shells are brought to machine by truck or conveyor and are hand fed or automatically slid into the ball bearing cradle rolls and marked as the slide die holder passes over.

The heavy slide operates steadily, marking a shell at each forward or backward stroke by rotating the shell as the die passes over it. The ample size motor and reducer are mounted inside housing with a push button control mounted at a convenient position on the outside.

The design of this machine permits its use for general marking after need for shell marking has passed. An economical feature is its design for the use of straight line flat dies or type, which are cheaper than the rotary kind.

Additional specifications and information are available from The Acromark Corp., 259 N. Broad St., Elizabeth, N. J.

# ERRINGTON MECHANICAL LABORATORY

MAIN OFFICE AND WORKS: STATEN ISLAND, NEW YORK

Chicago Office: 6422 N. RICHMOND STREET

New York Office: 200 BROADWAY

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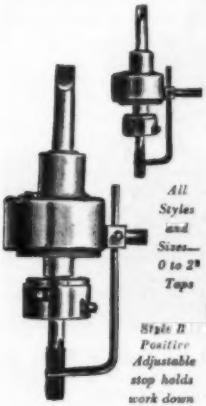
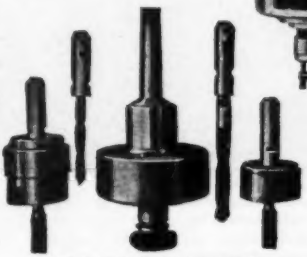
**CLUTCH OR CONE DRIVE**

*Our High Speed Tappers are Super-Sensitive for Small Tapping*

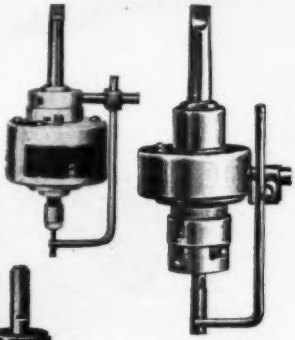


*All Styles and Sizes... 0 to 2" Taps*

*Style B Positive Adjustable stop holds work down*



*Style D-E, Quick Change Tools*



*Style C Graduated Adjustable Safety Friction*

## Blade Breakage Stopped Production Insured

BY INSTALLING

PADDOCK Ball Bearing BAND SAW GUIDES

Recommended for New and Old Machines cutting all material at any speed.

**SENT ON 10 DAYS' TRIAL**

The use of Paddock Ball Bearing Guides increases the efficiency of the machines so that more and better work can be done. The hazard of operation is reduced. Most of the blade breakage is eliminated. Wheels are interchanged—in effect, three sets of guides in one.

**Write for details today and list of prominent manufacturers using Paddock Guides.**

## PADDOCK TOOL COMPANY

*Guide Makers Since 1920*

1418 Walnut St., Kansas City, Mo.

## Arc Welding Speeds Gun Carriage Construction

Carriages for the 155 m.m. guns pictured above are being manufactured by Pettibone Mullikin Corp. of Chicago on a regular assembly line basis. Production is organized so that a force of 350 men can easily maintain a schedule of 40 complete units monthly.

Most of the steel used in the carriages is Low Alloy Hi Tensile—special steel being used only where necessary.

**DYKEM STEEL BLUE**
***STOPS LOSSES***
**making dies & templates**

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

*Write for full information.*

**THE DYKEM COMPANY**
2301G N. 11th St., St. Louis, Mo.
(In Canada: 3194 Dundas St., West, Toronto, Ont.)

Most of the steel is obtained already fabricated—the balance being flame cut according to master templates. All joints are scarfed either 45 or 60° in accordance with data from the Rock Island Arsenal, who were pioneers in construction of this type.

Tack welding and short seam welding is all done manually using 13-18 carbon reversed polarity rods to give maximum ductility. Welding positioners, as shown in the illustration, are used extensively. Positioning has improved welds to such an extent that X-Ray testing is practically eliminated —except, of course, where spot checks are made to insure against human element errors. Longer welds are tested with Magna-Flux method.

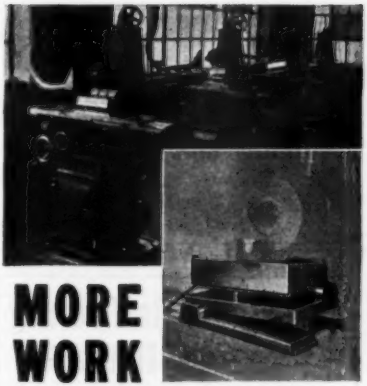
The finished carriage with the gun mounted is subjected to a 1000 mile road test, and preliminary results show an average of 33 miles per hour, with a top speed of 75 m.p.h. For firing, rear wheels are removed and left and right trails are spread out so that entire carriage is lowered to the ground.

(Illustrations—Courtesy Hobart Bros., Co., Troy, Ohio.)

## Automatic Timer for Ace Welders

Ace Spot Welders made by Pier Equipment Mfg. Co., Benton Harbor, Mich., are now offered with a new type of precision timer for automatically controlling the welding time period. Thus equipped, the element of human error is eliminated. Welding time can be quickly selected, hourly production increased and uniform welds assured. The operator simply feeds the work through the welder.

In the development of this new automatic timer, provision has been made for simple easy adjustment, there being three concentic scales on a convenient direct-reading dial as shown. Adjustment range is from 3 to 47 cycles (3/60ths to 47/60ths of a second), calculated in one cycle steps. Once the timing dial is set for a particular job, depressing the pedal is followed by closing of the welder contactor, energizing welding circuit and timing

MORE WORK from EVERY Grinder

A Magna-Sine should be available for every machine on which an average volume of angular grinding work is done.

The Magna-Sine saves valuable minutes—or possibly an hour or more—when any individual angular set-up is required. Multiplying this saving of time by the number of jobs on various grinders, you find the means to get many additional PRODUCTIVE HOURS from your present equipment.

In addition, no other chuck or similar device offers the precision accuracy of the Magna-Sine in grinding work requiring either single or compound angles. The Magna-Sine itself is built to the finest precision limits. By utilizing standard gauge blocks, rather than graduated scales or similar methods, every angle is determined to the exact limits of the blocks used.

A non-magnetic sine plate—built on the same principle as the Magna-Sine—is also available for accurate checking of angular machining work.

*WRITE FOR FULL INFORMATION*

The MAGNA-SINE

ROBBINS ENGINEERING CO.
639 Mt. Elliott Ave. • Detroit, Mich.

Jacques L. Abravanel, 8, Kasr El Nil St., Cairo (Egypt) interested import machine tools, industrial supplies and raw materials, asking catalogs and price-lists.


## "Bottle Neck" In Threading Ammunition Eliminated

**A New Automatic Thread Miller**

**FACILITATES**

**Fool-Proof Cutting Left and Right**
Internal and External Threads
Up to 7" Outside Diameter
5 to 20 Threads Per Inch

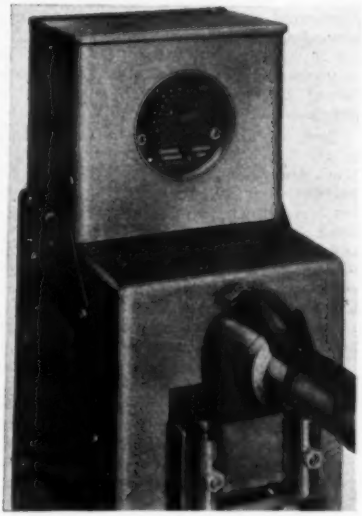
Irregardless of Thread System including Metric. Inspection Rejects Eliminated.

Combining Accuracy, Ease of Operation, Economy, Interchangeability of Parts, Precision, Simplicity With Low Price and

SPEEDY DELIVERY.

Agents with proven following wanted everywhere in United States of America and Canada.

**U. S. MACHINE TOOL MFG. CORP.**
**100 So. 6th St. Terre Haute, Indiana**

element. At end of the selected time period, the contactor is automatically tripped and welding circuit opened. Timer is of the electronic or tube type and maximum timing variation is controlled to a plus or minus 1/120th second on short time welding. Having no relays or other moving elements, it is claimed that timing adjustments are accurately maintained.

## DIAMOND ACME TOOLS

**Diamonds vary in quality and it is important to use the proper kind for a given job. "Bargain diamonds" are not an economy.**

If you don't know diamonds know your diamond dealer. Our 45 years in this field merits your confidence.

**ACME DIAMOND TOOL CO.**
**15 MAIDEN LANE, NEW YORK, N. Y.**

# MAGNI-RAY REVEALS DEFECTS

**the new illuminated magnifier such as**

- Burrs and poor finish on small parts, pins and screw machine products.
- Cracks in steel after hardening.
- Imperfect welding seams.
- Blow holes in castings, machine tool beds, tools and dies.
- You'll find the Magni-Ray a great improvement wherever a clear examination of work is required. Light shines directly upon the work from two sides and new, patented construction prevents glare. Magnifier may be removed from stand for observation of work in machine. The MAGNI-RAY is available in two standard magnifications, one with special corrected achromatic lens, without distortion.

*Write today for literature.*

**GEORGE SCHERR CO., INC.,** **122 Lafayette St., New York, N. Y.**

# A USEFUL ADDITION

Modern precision machine shops and inspection departments will find this sturdy 36"x 48" MILWAUKEE SURFACE PLATE a valuable addition. Constructed of semi-steel, accurately machined, securely mounted on cast legs which are machined and provided with SAE adjusting screws for perfect alignment. Height from floor to top of plate 30". Shipping weight 1200 lbs.

**No. 106-A**

We also make larger and smaller plates either with planed or scraped surfaces, whichever is desired. *Write today for full information.*

**J. C. BUSCH COMPANY** ENGINEERS AND MACHINISTS SINCE 1907

165 SO. BARCLAY ST., MILWAUKEE, WIS.

## Jefferson Swing Frame Grinder for Unwieldy Pieces

A swing frame grinding and polishing machine is announced by the Jefferson Machine Tool Co., 700 W. Fourth St., Cincinnati, O. An improved model known as the Jefferson No. 101, it can be swung forward and backward, up and down, right and left, and at any degree of angle or twist at the spindle head.

The Jefferson No. 101 is especially valuable for foundries, plating plants, and all other factories where it is necessary to grind, polish or buff large, unwieldy pieces. It is said to be particularly useful for cleaning castings preparatory to enameling, finishing, etc. It is also used for grinding or polishing sheets, tubing, bars, etc. too large and unwieldy for standard floor lathes. A scratch wheel brush can also be applied.

The weight of the motor and the counterbalancing cable and weights are reported to make operation easy. The machine hangs from the ceiling or other suitable support and is usually swung 3' from the floor.

For buffing, grinding, and polishing long flat sheets, bars, rods, etc., it is recommended that the piece be placed on a movable table.

This unusual machine will take grinding wheels up to 14"x2¾". Spindle is 1¾" in diameter and runs at 2100 r.p.m. Motor is 3 h.p. a.c. type, 3 phase, 220 v., 1750 r.p.m.

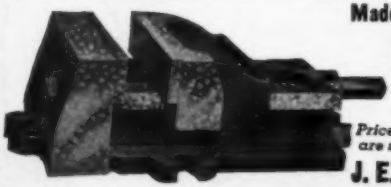
## Hobart Issues Complete Catalog

A handsome 38 page catalog describing the complete line of Hobart "Simplified" Arc Welders & Accessories is announced by Hobart Brothers Co., Troy, Ohio.

Colorful and filled with attractive illustrations, the new catalog introduces the different models of Hobart Welders, presents their important features and shows the full line of electrodes and accessories.


**PLUNKET IMPROVED VISES**

**Made Right—Work Right—Give Satisfaction**



**Drill Press Vise**

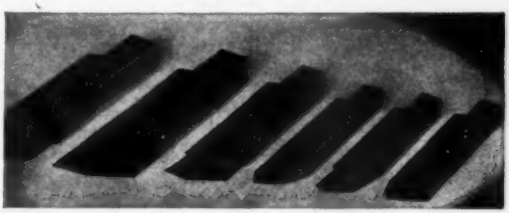
**With Extra Lugs for Bolting Down**

No. 1—6" jaws, 1½" deep, opens 5" wt. 35 lbs. $26.00
No. 2—10" jaws, 2½" deep, opens 8½", wt. 90 lbs. $38.00

*Prices are net f. o. b. Chicago. Dealers' inquiries are solicited. Write for illustrated folder today.*

**J. E. Plunket Machine Co.,** 1823 W. LAKE ST., CHICAGO, ILL.

## New Line of Carbide Tipped Standard Tools

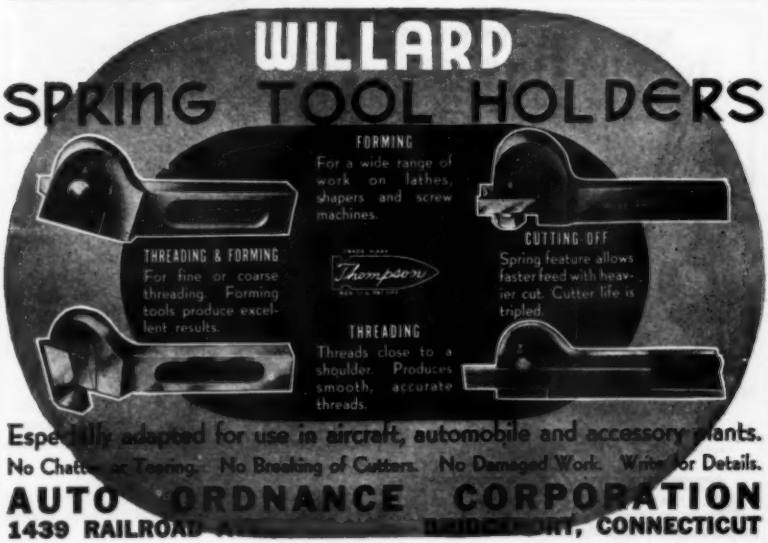


Tungsten Carbide Tool Co., subsidiary of Michigan Tool Co., Detroit, announces a complete line of standard "stock" tools comprising 6 styles and 46 stocked sizes. All tools have diamond ground edges and are ready for immediate use. Types suitable for cast iron, non-ferrous metals and for steel are included in the line. The tools are designed to cover most turning, boring and facing requirements and may be converted readily by the user into special shapes by simple grinding operations.

As these tools are made on a mass production basis, prices are said to be reasonable.

Due to the broad range of available styles and sizes, the company recommends that these standard stocked tools be purchased wherever possible. All styles and sizes in four grades are now available for immediate shipment, and other grades of Vascaloy, Carboloy, Kennametal, or Firthite, while available at no increase in price, can be delivered within one week on special order.

For identification on the customer's shelves, the styles and sizes suitable for cast iron and non-ferrous metal are furnished with gray shanks. Those for steel have black shanks. The tip finish produced by diamond grinding makes the tools suitable for work as soon as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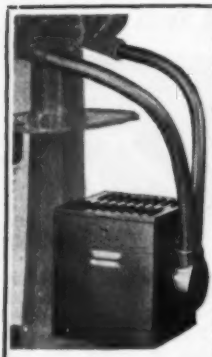
SPRING TOOL HOLDERS
FORMING
For a wide range of work on lathes, shapers and screw machines.
THREADING & FORMING
For fine or coarse threading. Forming tools produce excellent results.
Thompson
CUTTING OFF
Spring feature allows faster feed with heavier cut. Cutter life is tripled.
THREADING
Threads close to a shoulder. Produces smooth, accurate threads.
Especially adapted for use in aircraft, automobile and accessory plants.
No Chatter or Tearing. No Breaking of Cutters. No Damaged Work. Write for Details.
AUTO ORDNANCE CORPORATION
1439 RAILROAD
BRIDGEPORT, CONNECTICUT



# STOP DUST

Entirely self-contained, (motor, fan, filter, etc.) low cost, portable DUSTKOP, Model 600.

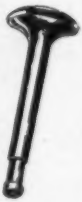
Capacity: 600 Cfm. Has ¼ HP, GE 110 Volt, Single phase, continuous duty motor. Air laden dust is stopped by horizontally placed spun glass filter, drops back into removable dust pan. Widely used on defense work on bench and pedestal tool, surface, cutter grinders, etc.

**AGET-DETROIT CO.,** 964 BOOK BLDG. DETROIT



# NO. 2 ALUMINUM CUTTING OIL

**For machining aluminum**



A very thin oil, prepared with special ingredients to insure the highest quality cutting of threads, holes, and other operations on aluminum.

***Write us for samples and information applying to your particular conditions.***

**PROTEX NON-RUST OILS, DRAWING COMPOUNDS AND ALUMINUM LUBRICANTS.**

Exceptional Service — Established 1898

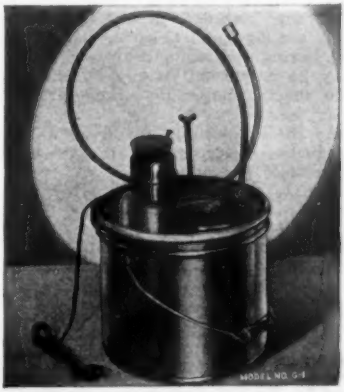
**Wayne CHEMICAL PRODUCTS CO.**

9446 COPELAND AVE. DETROIT, MICHIGAN


received by the customer. Complete specifications and prices are now included in a folder available from the company's offices.

## A Portable Coolant Pump

A new portable coolant pump for easy application to many machine tools is announced by Gray-Mills Co., Inc., 215 W. Ontario St., Chicago. Outstanding features of the pump system, according to the manufacturers, are its portability, ease of control of coolant flow,



and ease of replacement of all wearing parts. It will handle coolants of all but extreme viscosities and has an easily cleaned strainer, it is pointed out.

The pump comes with all necessary fittings to attach it to the machine tool. About all that's required is to plug into the electric line and put it into operation. It is particularly recommended for drill presses, lathes, tappers, cut-off saws, grinders, abrasive finishing and cut-off machines, and small mills.

To adapt any machine not so equipped, standard "Flo-Bac" pans are available, complete with necessary fittings for coolant return.

A folder descriptive of the Gray Portable Controlled Flow coolant Pump is available.

# DURO

## Surfacer · Polisher · Sander

RUBBER COVERED DRUMS

Lower Abrasive Belt Cost.

Cushion for inside rounded surfaces.

Less tension necessary without slippage.

OPEN CONSTRUCTION

Less set-up time.

Set vertically, gives flexible belt for irregular surfaces.

Set horizontally, long pieces run over work table.

Simple adjustments for changing from horizontal to vertical positions, for table adjustments to 45° and for compound angles for use with mitre gauge.

**DURO METAL PRODUCTS CO.**

DEPT. BBB 2649 N. KILDARE AVE., CHICAGO, ILL.

# JOHNSON HI-SPEED

## Heat-Treating Furnace No. 130
## Reaches 2300° F. in 22 Minutes

Here's the furnace for jobs requiring quick, high, accurate temperatures for hi-speed steels. The 4 correctly placed burners give intense uniform heat. Firebox, 13"x13½"x5½", is heavily lined. Johnson Furnaces all reach maximum temperatures in less than 30 minutes . . and also save up to ½ on gas consumption in a given time, over ordinary units.

Equipped with G. E. motor, extra large Johnson Blower. Complete $248 f. o. b. factory. Prices subject to change without notice.

Other sizes available—also built to order.

Our 40TH ANNIVERSARY YEAR

JOHNSON GAS APPLIANCES FOR EVERY INDUSTRIAL PURPOSE

602 E Ave. NW., Cedar Rapids, Iowa

CLIP AND MAIL TODAY

JOHNSON GAS APPLIANCE CO.
602 E Ave. NW., Cedar Rapids, Iowa

Please send me information on Furnace 130 and new Catalog.

Name .....

Address .....

City ..... State .....

**FAMCO**

**FOOT PRESSES AND ARBOR PRESSES**

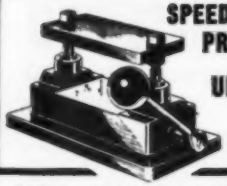
Scientifically designed, accurately machined from selected materials. 40 STOCK SIZES and MODELS (bench and floor types).

*Write for literature and prices.*

**FAMCO MACHINE COMPANY**

1320 18th STREET
RACINE - WISCONSIN





**SPEED UP PRODUCTION WITH UNIVERSAL VISE**

Only $29.75

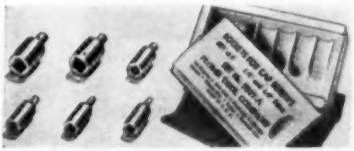
★ This complete, ready-to-use drill jig body helps to step up production and break troublesome bottle-necks. Lever locks work instantly — holds it securely — throw it back and work is released. No complicated adjustments. No costly drill fixtures needed — just an inexpensive drill bushing plate and adaptor for each job.

*Let us send a vise for*
10 DAYS FREE EXAMINATION
*or write for illustrated folder*

**MOHR LINO-SAW CO.**
130 N. Union Ave. Chicago, Ill.


## Plomb Offers New Sockets

Sockets for all popular sizes of socket head cap screws and set screws (Allen Type) are now available, made for use with various types of Plomb attachments.



Socket sizes are from ¼" to ⅝" for hexagon openings from ⅛" to ⅜".

Special alloy steel is used for endurance and strength. The drive plug is made separately from the socket part, and is held in position by a small set screw. In event the drive plug breaks, it is therefore very simple to remove it.

Additional information may be obtained from the Plomb Tool Co., 2209 Santa Fe Ave., Los Angles, Cal.

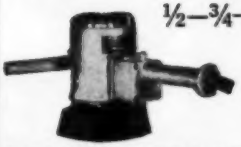
## Lo-Volt Transformer

A new safety device for workmen using electrical extensions in damp, all metal or otherwise hazardous locations is announced by the Ideal Commutator Dresser Co., 1441 Park Ave., Sycamore, Ill.

It comprises a step-down transformer that is easily plugged in between power supply and extension to reduce the extension voltage to a harmless 6 volts. Thus, danger from shock caused by bad


**CUTS GRINDING COSTS**

½—¾—and MORE



HEAVY DUTY

3 Phase
60 Cycle
No Brushes

**GASTON POWER TOOLS**
2655 W. 95th St., Evergreen Pk. Ill.

600 ROOMS with BATH and RADIO

FROM $3.00

- Ideal Location
- Unlimited Parking
- Radio in Every Room
- Refurnished & Redecorated

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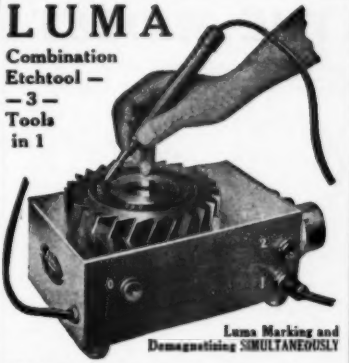
LUMA

Combination Etchtool — —3— Tools in 1

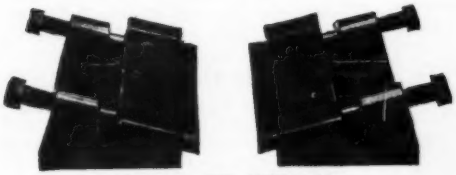


Luma Marking and Demagnetizing SIMULTANEOUSLY

Writes on hardened steel — demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact—easy to use—dependable.

*Send for details—5-day FREE TRIAL OFFER!*

Luma Electric Equipment Co.
Dept. H—Main P. O. Box 132, Toledo, Ohio



HART'S
Divided Machine Vises

These Vises will hold work the full length of the table, if necessary. Useful on planer, milling machine, surface grinder or drill. They adapt themselves to any shape and can be used on sides of table as well as ends. The Jaws are tool steel and hardened, the angle holding the work down on the table.

| | |
|---|---|
| Size of Base | 5x7 inches |
| Size of Jaw | 3x6 inches |
| Height at highest Point | 2¼ inches |

When writing for descriptive circular kindly mention the BLUE BOOK.

HART MACHINE CO.
26 Mather Street, - Dorchester, Boston, Mass.

HART'S
Milling Fixtures

These fixtures will make themselves popular and profitable in your shop. Easily kept clean to receive the work. May be used in either horizontal or vertical position. Suitable to hold round, hexagonal, octagonal, or square stock, aligning the work with the machine. Grip holds the work on the bottom as well as on the back. Shipped in pairs, unless otherwise ordered. Made in 4 sizes—$\frac{3}{4}$" to 4".

# THE MIDGET

HALF SIZE

*LATEST ADDITION TO OUR LINE OF INDICATORS AND GAGES*

*Designed for those "Hard To Get At" Places.*

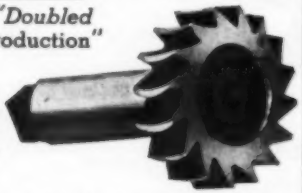
Waltham Dial Gage Co.
STOW, MASSACHUSETTS



The *New* Aber
*Curved Tooth*
**WOODRUFF KEYWAY CUTTER**

*"Doubled Production"*

according to reports.



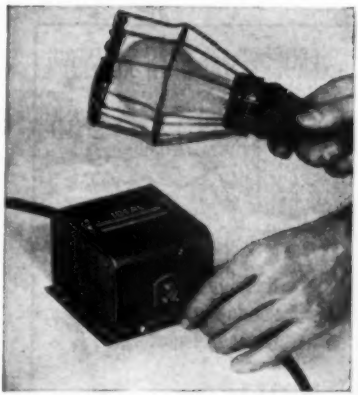
**Many advantages over old-type keyway cutters:**

More cutting edge — Gives shearing cut
Cuts 50% faster — Easy to sharpen
More cuts per sharpening

Full line standard sizes, round or square end shank, in stock. Special size cutters made to order. Territories available.

*Circular with prices, on request.*

**ABER ENGINEERING WORKS**
1613 Flett Ave. Racine, Wisconsin

sockets or defective extension cords is eliminated.

The Transformer has a 10′ three-conductor safety type primary cord. Capacity is 50 watts with a 25′ extension. Longer extensions require proportionately lower watt lamps. Available for 110 volt, 50-60 cycle or 25 cycle A. C. Weight, 4½ lbs. (60 cycle), 6-¾ lbs. (25 cycle). Size only 2-⅞″x3-⅞″x4″.

## Multi-Pole Contactor Leaflet

For use on machine tools and controllers as relays in control circuits and to control small motors, multi-pole contactors are described in a new 3-page booklet.

The contactors are rated at 10 amperes a-c., with a maximum interrupting capacity of 7500 voltamperes a-c, and a maximum voltage of 600 volts.

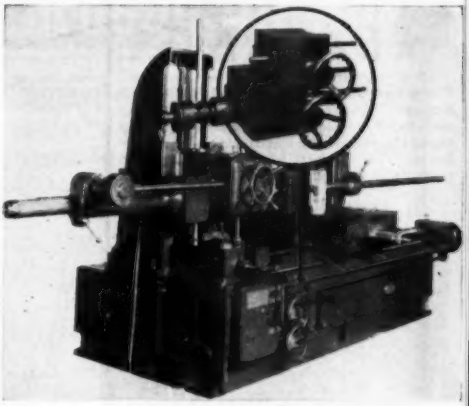
Contactors are available in two-to eight-pole forms and their application is fully explained. Construction details are also given.

Instructions for maintenance explain removal of contacts and renewal of parts.

Tabulations of renewal parts data give numbers and sizes of all parts. Illustrations of parts are also shown.

Copies of instruction leaflet 3283-A may be obtained from Department 7-N-20, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

## Independent Drive Units Facilitate Replacement



The manufacturers announce that Flexoid Speed Control Units are now being manufactured for numerous machine tool builders, for incorporation in their machines which they are building from the bottom up as speed change gear boxes and feed change gear boxes. These units, being fully enclosed and operating in a bath of oil with anti-friction bearings, are especially adapted for such service.

The units are built in standard models of 4 and 8 speeds in a range of sizes up to 15 h.p.

An advantage of using this type of power unit is emphasized in the illustration which shows application to a Vertical Boring Mill at the Yoder Mfg. Co. The point is that the units are independent and in case of need for replacement or replacement parts, the units themselves can be replaced immediately without a long shutdown. In other words, the units can be classed in the same category as motors as they are easily replaced.

All of the gears in Flexoid Units are accurately machined, hardened, and the teeth are shaved. The gears operate on spline shafts and are quiet in operation.

Control handle for shifting to the various speed ratios can be arranged in a remote position to suit the operators of individual machines.

The units are manufactured by the Smith Power Transmission Co., 1545 E. 23rd St., Cleveland, Ohio.

**SPEED DEFENSE WORK**

**By Using**

Elgin AC Electric Arc Welders — Constructed for ease and efficiency of operation; built for long and hard service—truly, "up - to - the - minute" welders.

**BORM**

**Manufacturing Co.**

**ELGIN, ILLINOIS**

**First Manufacturer of Adjustable Limit Snap Gages in U. S.**

**A G D Standard**

Plug Gages—Adjustable Limit Snap Gages

Adequate stock ready to grind to special specifications

Priced on Cost—not on Demand

**JAS. CLARK**

**143-17TH AVENUE, PATERSON, N. J.**

*Successor to*

**Jas. Clark Jr. Pneumatic Tool Co. and American Gage Co.**

ELIMINATE HAND

REAMING

Power Reaming at its best. Saves time and money. Improves your work. Speeds up removal of burrs from tubing as well as from bores after keyseating or drilling of set screw holes. The Catskill also saves on finish reaming, countersinking and counterboring, smoothing off and chamfering sharp edges of round bar stock and many other finishing jobs.

*Write for details and prices.*

CATSKILL METAL WORKS

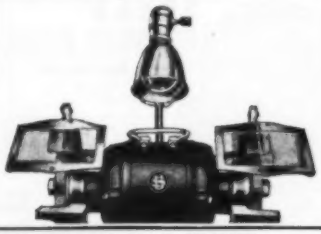
CATSKILL, N. Y.


## Heavy Duty Industrial Cleaner

A new Portable Vacuum Cleaner, known as the Tornado Noiseless Model 230. is announced.

Features are extremely quiet operation, great power and ease of handling. The motor and fan noise is said to have been reduced to a negligible factor. Only the sound of the air rushing through the nozzle and cleaning tools is audible a few feet away.

Designed for heavy-duty service the machine is equipped with a full horsepower motor mounted on grease sealed ball bearings which require no oiling. The multi-stage, turbine fan has ample

FLEXIBLE LIGHT . . . .
Where Most Needed

Get better production per machine . . . save eye strain . . . overcome night-time lighting handicaps . . . by installing VIMCOLIGHT. Gives light at any angle, concentrated, non-glare, low-cost. U.S. ELECTRIC UTILITY GRINDERS offer this modern equipment. Are your machines Vimcolighted? *Get full details.*

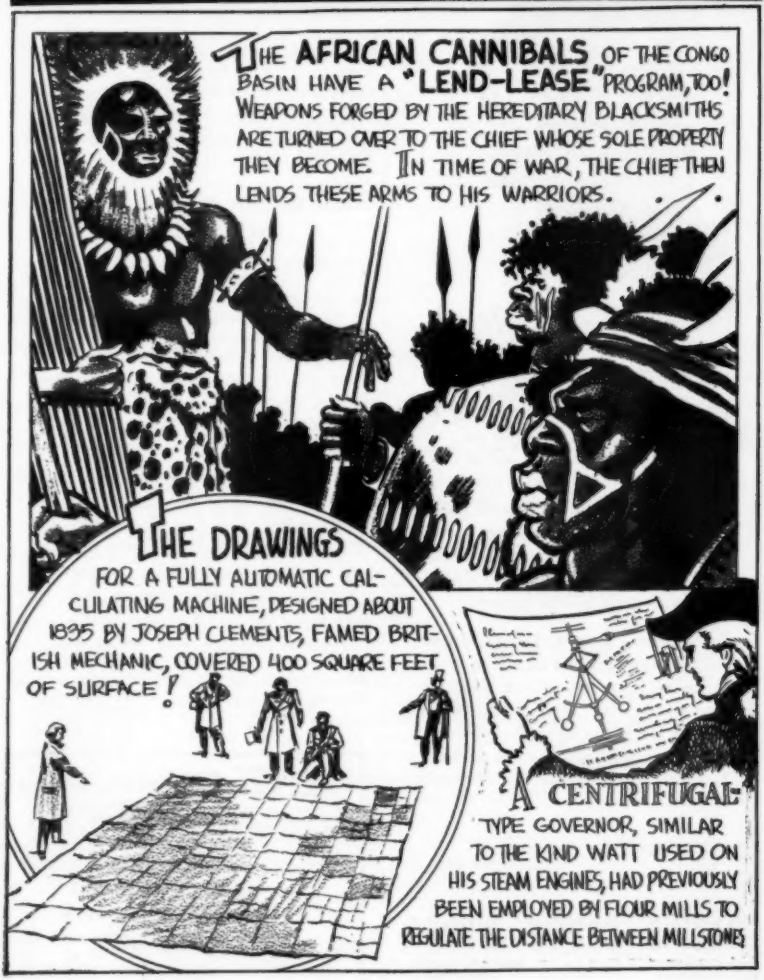
VIMCOLIGHT

VIMCO MANUFACTURING CO.
80 CHENANGO ST. BUFFALO, N. Y.

BREMIL MFG. COMPANY
1700 Pitts. Ave., Erie, Pa.

ALL-ALLOY compound lever strap cutter. Cuts 1½ strap with one stroke.

# Mechanics Through the Ages


THE AFRICAN CANNIBALS OF THE CONGO BASIN HAVE A "LEND-LEASE" PROGRAM, TOO! WEAPONS FORGED BY THE HEREDITARY BLACKSMITHS ARE TURNED OVER TO THE CHIEF WHOSE SOLE PROPERTY THEY BECOME. IN TIME OF WAR, THE CHIEF THEN LENDS THESE ARMS TO HIS WARRIORS. . . .
THE DRAWINGS FOR A FULLY AUTOMATIC CALCULATING MACHINE, DESIGNED ABOUT 1835 BY JOSEPH CLEMENTS, FAMED BRITISH MECHANIC, COVERED 400 SQUARE FEET OF SURFACE!
A CENTRIFUGAL-TYPE GOVERNOR, SIMILAR TO THE KIND WATT USED ON HIS STEAM ENGINES, HAD PREVIOUSLY BEEN EMPLOYED BY FLOUR MILLS TO REGULATE THE DISTANCE BETWEEN MILLSTONES

Hold Small Work
*SECURELY*
*with these* HANDY
DRILL JIGS

Self contained and well built. Quick to change for length and diameter, for both shoulder work and gauging from the end. Chips fall away from gauging parts.

A.S.A. Standard bushings with liners to drill any size hole up to ¼" diameter. One bushing furnished with Jig. V block to center work. Can be made any form for holding special pieces. Locking handle can be reversed for either hand.

*Write for full details today.*

RACINE SCREW WORKS
RACINE, WISCONSIN

suction for fast, thorough cleaning, and the large tank and filter provide plenty of space for dirt accumulation. Yet the machine is light in weight (only 50 lbs.).

Attachments and cleaning tools are available for cleaning floors, rugs, carpets and upholstery. In addition, a wide variety of attachments is available for various types of industrial cleaning.

Address Breuer Electric Mfg. Co., 5118 N. Ravenswood Ave., Chicago, for details.

## DoAll Saw Sizes Conform to O.P.M. Ruling

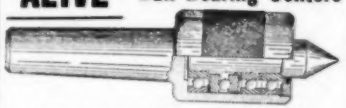
In line with the recent ruling of Office of Production Management, Doall Band Saws will be made in future in the 42 standardized sizes given in the accompanying table: all Raker Tooth, Heavy Set, A Temper:

| Width | Gauge | Set | Pitch (Number of Teeth to Inch) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3/32" | .025 | .042 | | | | | 18 | | 32 |
| ⅛" | .025 | .042 | | | | 14 | 18 | 24 | |
| 3/16" | .025 | .042 | | | 10 | | 14 | 18 | 24 32 |
| ¼" | .025 | .042 | | | 10 | 12 | 14 | 18 | 24 32 |
| 5/16" | .025 | .042 | | | | | | 18 | 24 |
| ⅜" | .025 | .042 | | 8 | 10 | | 14 | 18 | 24 |
| ½" | .025 | .042 | 6 | | 10 | | 14 | 18 | 24 |
| ⅝" | .032 | .050 | | 8 | 10 | | 14 | 18 | 24 |
| ¾" | .032 | .050 | 6 | 8 | 10 | 12 | 14 | | |
| 1" | .035 | .057 | 6 | 8 | 10 | | 14 | | |

No other sizes can be supplied without approval of the O.P.M.

To be right up-to-date, every band saw user is invited to send for new literature covering this ruling, also recommended substitutions for discontinued sizes, to the Doall Company, Des Plaines, Ill.

"ALIVE" Ball Bearing Centers



"They turn with the work"
Write TODAY — and let us tell you more about them.
MODERN MACHINE CORP.
323 Berry St., Brooklyn, N. Y.

# KEEP 'EM TURNING with SPIEGEL-SPRAY Coolant Pumps

Coolant gushing or trickling over work as you choose, keeps machine tools in operation—reduces "time out"—saves wear on cutting tools. Completely portable, one Spiegel-Spray pump can serve several machines not in constant use. Sturdily built of finest materials, accurately engineered for trouble-free performance, Spiegel-Spray pumps are surprisingly inexpensive. We also have a big line of pumps without tanks for all purposes. Quantity discount to manufacturers.

Write Today for Descriptive Folder and Prices

G. B. SPIEGEL CORP.

3962 S. Calumet Ave. Chicago, Illinois

# "PENCILPOINT" DIAMONDS FOR TRUING GRINDING WHEELS

These diamond tools are regular equipment in the grinding of broaches, form milling cutters, ground taps, punches, dies, etc. Send us your inquiries; or blue print of wheel outline for our recommendations. Some of the diamonds are cut to form; others are natural shapes, best adapted to the purpose.

P-2

*For full information write F. F. Gilmore & Co.*

F. F. GILMORE & CO. 112 DARTMOUTH ST. BOSTON, MASS.

**TROYKE ROTARY TABLES**

Moderately Priced

Made in 9", 12", 15", 18", 21", 25".
With or without dividing attachment.
*Ask your dealer or write us for new 1941 8 page catalog.*

**ALFRED A. TROYKE**
4422 Appleton St., Oakley, Cincinnati, Ohio

**—GEARS—**

**Spur—Helical—Worm—Bevel—Miter, Etc.**

We do broaching and all kinds of grinding.

We specialize in grinding hardened steel bushings, cam rollers, etc.

Prompt service and quality has retained a large list of customers for 25 years.

**TAYLOR MACHINE CO.**
1919 E. 61st St., Cleveland, Ohio

## Coolant System for Wet Belt

A new circulating, force feed coolant system for their Type G-8 wet abrasive belt grinder has just been announced by the Porter-Cable Machine Co., Syracuse, N. Y. It is connected to the base of the grinder and operated by V-belt connection to the machine's main drive pulley.

***GOOD NEWS!***
**for DIE MAKERS**

**Transfer Points Eliminate Guesswork in Die Making**

There's no chance for error when you use transfer screws as markers in setting dies. Points are of uniform height above hex base. Six accurately made and hardened screws nest in a special holder with hex wrench tip. Made in ¼" to 1" diameters.

| | | | | | |
|---|---|---|---|---|---|
| 3/16" | $1.50 per set | 5/16" | $1.25 per set | 7/16" | $1.40 per set |
| 1/4" | 1.20 " " | 3/8" | 1.35 " " | 1/2" | 1.50 " " |

**HEIMANN MFG. CO., URBANA, OHIO**

The frame is cast iron, housing a reservoir, gear-type pump, and a cylindrical straining screen. A removable head above the screen gives accessibility for cleaning. All moving parts are completely guarded.

This circulating unit allows for use of this machine in any part of the plant without connections to water or drain pipes, and makes possible the use of any desired liquid coolant. It also makes practical the reclamation of ground off particles if desired. The wet-belt grinding method is finding wide use on many grinding and surfacing operations on metal, mineral, plastic, ceramic, and other materials.

## Walker-Turner Offers New Catalog

A new and completely revised catalog containing 56 pages has been issued by the Walker-Turner Co., Inc., Plainfield, N. J. It is profusely illustrated and explains in detail the standard line of metal working and wood working machine tools made by this company.

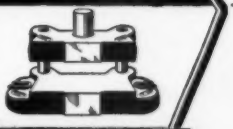
Also shown are a number of entirely new machine tools developed primarily for the defense industries. A unique Radial Drill Press, two polishing Lathes and a Radial machine for cutting ferrous and non-ferrous metals, plastics and ceramics are featured.

The other well known machine tools manufactured by this company and described in the catalog include Metal-cutting Band Saws, Radial Saws, Circular Saws, Jointers, Lathes and similar products.


**SOLID OAK OR POPLAR GS**
**MACHINISTS TOOLCHESTS**

Also leatherette-complete line. The right type of chest for for every mechanic from higher grade to more reasonably priced.
**BEFORE ORDERING ANY TOOLCHEST, write for our literature.**
**Geo. Scherr Co.**
122 Lafayette St.
New York, N. Y.

**BAUMBACH**

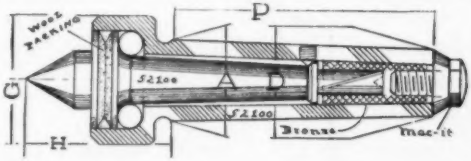


**STANDARDIZED**
Machined Steel **DIE SETS** Semi-Steel
**Drop Forged Steel**

Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 195,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

***Send for our new 336 Page Catalog.***

**E. A. BAUMBACH MFG. CO.**
1810 So. Kilbourne Ave., CHICAGO, ILL.

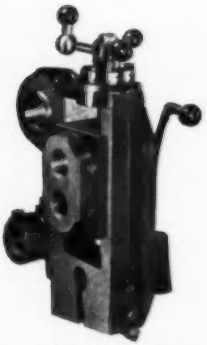



**No. 52100 Steel, Gold Seal Balls, Mirror-Finish bearings, Mac-it Screws, Integral Ball-Races, Gracefully tapering Spindle, Bronze Bushing, Minimum Parts, Repeat Orders & 100% Collections, are the characteristics that go with the Rigid Live Centers.**

**RIGID TOOL CO.,** 2000 Witherell St., Detroit, Michigan

## Turret Lathe Turning Head

A new heavy duty adjustable turning head for turret lathes is announced. This tool is designed for turning and boring work, accommodating standard cutter holders in one of the two holes on the slide, as well as additional tool holders in the auxiliary slide mounted at the rear. Provision is also made for mounting of a drill or boring bar, together with a facing cutter.

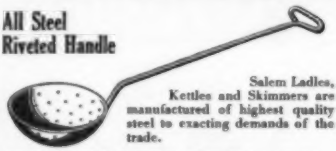


The main slide is quickly adjusted to size by means of a ball crank handle, fitted with a large micrometer dial and observational clips.

For further information address Gisholt Machine Co., 1185 E. Washington Ave., Madison, Wis., specifying make and model of turret lathe on which tool would be used.


**Pressed Steel Skimmer**

All Steel
Riveted Handle



Salem Ladles, Kettles and Skimmers are manufactured of highest quality steel to exacting demands of the trade.

**THE SALEM TOOL CO.**
SALEM OHIO



Special Anti-Mushrooming
Anti-Chipping Heat-treat
Oversize Shanks
Exclusive Knurled Back
Exclusive Thumb Grip
Broach-Rounded Corners

and a complete line of Marking Devices

*Write for Price and data Bulletin No. 113-12 A*

**NEW METHOD STEEL STAMPS, Inc.**
149 Joseph Campau, Detroit



**Work Wanted**

A NATIONALLY KNOWN MANUFACTURER OF PRECISION MACHINERY HAS FACILITIES FOR TAKING ON ADDITIONAL WORK for: W. & S. Turret Lathes, Boring Mills, Lathes, Punch Presses, Screw Machines, Precision Cylindrical and Internal Grinding, also Sub or Full Assembly Work.

**BOX 142**
c/o **Hitchcock Publishing Co.**
508 S. Dearborn St., Chicago, Ill.

## HEADS N. M. T. B. A.

At the recent Fall meeting of the National Machine Tool Builders Association in Chicago, Clifford S. Stilwell was elected President for 1941-2. As well as wielding the gavel at Association Meetings, Mr. Stilwell is Executive Vice President, The Warner & Swasey Co., Cleveland, Ohio.

## "Dry" Oils for Industrial Use

Designated by the trade name of "Van Caloria," new oils containing colloidal graphite and designed for high temperature lubricating (above 400° F) are added to the line of industrial lubricants announced by Esso Marketers. These lubricants are being distributed by Standard Oil Companies of New Jersey, Pennsylvania and Louisiana; the Colonial Beacon Oil Company; and Penola, Inc.

Under the high temperatures for which the lubricants are desfgned, the oil gradually vaporizes leaving no residue from the oil itself but only a fine film of "dry" colloidal graphite.

★

**to A-1 Defense Priority Orders**

If you need more press production NOW, take advantage of this early delivery date—but don't delay! . . . Give those light jobs to smaller presses—like this Rousselle No. 1—and pocket the savings for your firm. TODAY—when the big machines are needed for full production on heavy work, invest in "high speed-with-safety" Rousselles!

** For full data, write, wire or phone TODAY*

***Distributors: Few select territories still available.***

**DAVID J. ROSS CO.**
BENTON HARBOR, MICH.

# These Plants Are Available

SUPPLEMENTING the lists recently published in these columns, here are additional plants equipped for subcontract work. Other plants are available, with sizable screw machine and gear cutting facilities. If you need such equipment, please let us know dimensions and volume required and we will supply full information.

Address all communications to Defense Sub-Contract Dept., Hitchcock Publishing Co., 508 S. Dearborn St., Chicago, Ill. No obligations are entailed. This is a gratuitious service originated by the BLUE BOOK for the sole purpose of helping defense efforts in the current emergency.

**H-7:** Midwestern company has already obtained a number of direct defense contracts; also several sub-contracts and is familiar with the general requirements. Occupies own reinforced concrete building of approximately 165,000 sq. ft. of floor space, with about 500 employees, skilled in many different trades. Metal working machinery includes:—22 drill presses up to 2" drill capacity; 10 punch presses up to 3" stroke; 3 shears up to 62" width; 2 brakes up to 96" width; 2 automatic screw machines up to 1" round bar stock; 5 turret lathes up to 1-5/8" round; 4 engine lathes up to 15" swing; 5 threading machines up to 1½" pipe; 1-12" double face disc grinder; 4 automatic pipe polishing and buffing machines up to 6" o.d.; hand jigs and bending fixtures up to 1½" tube, ¾" rod; 1 hydraulic bending machine, capacity up to 1-1/16" dia. tube or rod; 5 spot welders up to 15 KVA; butt welder up to ⅝" round rod; 300 amp. arc welder; 2 acetylene welders; 3 power milling machines; 2 hand milling machines; 16" Tannewitz abrasive cut-off machine; No. 2 B&S surface grinder; 12" Whipp shaper; Cincinnati tool grinder; filing machine; Stewart 11½x17x6" hardening furnace; Chicago tubular riveting machine; Haskins ⅜" tapper; 15 tappers and heads up to 1-⅝"; contour saw; degreasing tank; pickling room; plating set-up for bronze, copper, chrome, nickel and zinc—tank capacity up to 13'; complete semi-automatic nickel plating equipment; tool room and die shop; also complete set-up of wood-working machines and equipment for papier mache, plaster and composition production.

**H-8:** Eastern manufacturer of fine scales and weighing devices is interested in drilling, screw machine, tapping, milling, light stamping, spring winding, heat treating, gear hobbing, assembly, paint finishing and baking, spot welding, rough grinding and all types of wood-working sub-contract work. Set-up is such that they can furnish complete units by supplying the castings on which any of the machine work is to be performed. Subsequent to machining, plating and finishing can also be handled. Equipment includes 2 screw machines, 2 gear hobbers, 11 lathes, 8 milling machines, 23 drill presses, 2 tapping machines, 9 grinders, 9 heat treating furnaces, 14 power presses, 2-16" shapers, Lindley jig borer, V-16 Doall contour saw, 24"x24"x48" spur-geared planer, 3 Sleeper & Hartley spring coiling and hooking machines, degreaser, slip roll forming machine, spot welder, die filer, 2 power saws, 150 amp. arc welder, cut-off machine, 5' shear, tumbling barrel, spray booths, steam baking ovens and miscellaneous wood-working machines.


## Do FORMING DIES form BOTTLENECKS?

Micro Die Substitute Machines (Bender, Brake, Shear,) will show you how to avoid dies entirely in many cases.

*Net Weight 150 lbs.*

The users of the original small Micro Bender (No. 1) are so enthusiastic over its precision work, ease of adjustment and adaptability to many uses, they have repeatedly asked us for a larger machine to do heavier work. In response to this demand, we introduced

**"Micro" BENDER No. 2—Bends ½" Cold Rolled Steel Bar**

or larger sizes of other more ductile materials in proportion. Handles round or square tube, angle, channel, wire, strip stock, etc. The range of contour bending and die duplicating operations is limited only by bending qualities of material used. *Write for circular—"Metal Duplicating Without Dies"*

**O'NEIL-IRWIN MFG. CO., 314—8th Ave. So., Minneapolis, Minn.**

# Now for Sub-Contract Work

**Firm: H4** Midwest plant with 60,000 sq. ft. of floor space, is at present working day shift only. Could add two night shifts. Has unusually wide range of equipment including:—2 head planer, 18' table, 32" between housings, 30' bed; 10' power press brake, 8 gauge; turret lathe; 16 bench type drill presses, all sizes; 6 engine lathes; 10' 8-ga. power shear; 5 disc grinders, double end; 5 milling machines; shaper; radial drill; 5 metal cutting saw tables; 11 floor type drill presses, all sizes; 4 buffing and polishing lathes; 5 endless belt sanders; 4 swing polishing lathes; 4 pipe bending machines; 250 and 450 amp. arc welders; Heavy duty abrasive cut-off machine; tilting band saw; 2 complete acetylene welding outfits; large spray booth; Also the following woodworking machinery:—2 blade, 16" joiner; 2 blade 24" planer; 15" tilt table rip saw; 36" band saw; 16" disc sander; 24" throat jig saw; 14" swing, 24" bed and 26" swing and 80" bed woodworking lathes. Also complete nonferrous metal foundry and equipment with 4 gas and oil burning melting furnaces; sand blast outfit; cranes; core ovens, sand sifting riddles, band saw, etc. Can do machining and finishing work to specifications, furnishing pattern work, castings, sheet metal work, stampings, assembling, etc.

**Firm: H3** Midwest firm offers experience of more than 30 years in metal stamping and die field. Has four experienced tool and die makers available for producing tools and dies for work to be run through production department. Equipment includes:—32 presses up to 65 tons, 4" stroke, 4 press brakes, 18 gauge 72"; 4 spot welders; 3 horizontal shapers; 3 lathes; 2 filing machines; 1 tool grinder; power hack saw; plain milling machine; 4 squaring shears; 2 high speed hammers; d.c. arc welder; acetylene welding outfit; 6" vertical shaper; 4 drill presses; Doall contour saw; Abrasive cut-off machine; small electric furnace, etc.

**Firm: H2** Manufacturer of small automotive parts—open shop—75 employees, female operators and assemblers. Want punch press work for 50 ton presses and smaller automatic screw machine work for No. 2 B&S and smaller; have milling, riveting, eyeleting and welding equipment for complete assemblies in brass, steel and Bakelite and job spot welding in 14-gage and lighter. Occupies only half of present building and could build higher or use more ground area as needed.

**Firm: H1** Midwest firm is equipped for fast, precision grinding work with following equipment:—No. 3 Bryant semi-automatic internal grinders - hydraulic - capacity 6" chucking, 2" length of piece; No. 2 Cincinnati centerless, 1/16" to 4-¾" o.d. capacity, both infeed and through feed grinding; No. 212 Besley double end grinder, capacity—length of piece 10". Also have several lathes, some milling capacity, drill presses, spot welders and general welding outfit, metal slotters (abrasive type), several bench grinders, Rockwell hardness tester and large assortment of inspection gages and instruments, with adequate skilled labor available.

**FIRM: K** A sizeable job shop with 35 to 40 men per shift. Open shop. This firm has been functioning for 15 years as high grade tool shop, job basis.. Have 5 toolmakers, 8 hand screw machines (up to 3" capacity), 10 lathes of all kinds up to 20" throw. Specialize in aluminum and magnesium although can handle heat treated steel. Has made can machinery for non-sanitary cans. Designers of machinery. Have been doing aviation work for 2 years. US Army praises their fine work in which there are no rejections. .0005" tolerances. Making some direct navy work. 9 engine lathes, 6 turret lathes, 6 milling machines, 14 drill presses, 3 grinders, 3 punch presses.

**FIRM: M** A tool and machine plant . . . die work, job shop. Have made dies for years for Westinghouse, A. B. Dick Co., Sangamo Electric Co. Have some brand new equipment. Considerable defense subcontract work now.

**Firm: N** One of the best known firms in midwest. Seeks work which will include punch presses, if possible. Tool room tolerances: .000½ to .0003" in gauges. Open shop. Fine personnel. Versed in heat treated steel; aluminum. 10 lathes, 8 mills, 4 shapers, 14 grinders, 8 drill presses, 28 punch presses and a big variety of miscl. equipment and precision gauges.

**Firm: P** Already very busy but needs even more volume to fill big new addition to present bldg. Doing lots aircraft work. Have 15 milling machines, boring mills, drill presses, grinder, jig borers, bench lathes (5) and 5 engine lathes, 5 surface grinders, 6 shapers. Vast variety of small tools; also complete heat treating equipment and 2 sets Johansson blocks and Carl Zeis instruments.


## Sub-Contract Work Wanted

**Able to do accurate precision grinding. Quick and dependable service. Have the following equipment: Bryant Internal Grinders, Cincinnati Centerless Grinder, Besly Double End Grinder, Lathes, Milling Machine, Drill Presses, Welders, Precision Gages, etc.**

***Let us submit a bid—no obligation.***

**L. G. S. Spring Clutches, Inc.**

**1413 Naomi Street, Indianapolis, Ind.**

## American Micron Gear Hobber

An American-built small gear hobbing machine of a type similar to the Swiss "Mikron No. 79" is now being marketed by Triplex Machine Tool Co., 125 Barclay St., New York, N. Y. It has a capacity for spur gears and pinions up to 2" diameter and DP 20. The maximum length of cutting is 1.60".

The machine is designed to cut accurate brass and steel wheels and pinions such as are used in watches, clocks, meters, etc., as well as in gauges and other precision instruments.

Gear blanks are firmly held on a work arbor, which on one end fits into a taper hole in the work spindle nose. Pinions are held in a spring collet chuck which itself fits into the work spindle taper. A tailstock supports outer end of the work piece or work arbor.

Hob spindle is mounted on a vertical slide having micrometer hand feed for positioning hob to proper depth of cut. The entire assembly has a horizontal power screw feed with automatic stop.

Revolution of the hob spindle, through index change gears in rear of machine and through a worn wheel on workspindle, is transmitted to the latter in a ratio proper for the number of teeth to be generated. A set of index change gears for one chosen number of teeth between 6 and 390 is furnished with each machine. Additional change gears for any other number of teeth can be furnished and are easy to mount.

If the tooth shape is of the involute type, one hob will cut all gears of an identical diametral pitch regardless of the number of teeth. For cycloidal teeth, however, an indivdual hob is required for each particular number of teeth.

Rotation of work spindle, over a pair of helical gears, change gears on the front of the machine and a worm drive, is transmitted to the longitudinal feed screw in a ratio appropriate for the feed of the hob. A set of feed change gears for 6 feeds between .004" and .030" per revolution of hob is furnished with each machine.

A hand wheel engages automatic longitudinal feed of hob spindle slide and an adjustable stop stops it when work is finished. Simultaneously driving motor is switched off. The operator then removes finished pinion or stack of wheels, re-loads work spindle, returns hob to its starting position and again starts motor and automatic feed.

The 1/3 h.p. motor is mounted inside pedestal and drives hob spindle over a pair of two-step pulleys and a flat belt. Provision is made for constant belt tension.

Hob spindle speeds of 518 r. p. m. for steel and 1030 r. p. m. for brass are standard, but additional motor pulleys are available for other speeds.

A self-contained motor pump furnishes a constant flow of coolant from a tank in base. Returning liquid passes through a settling compartment in tank.

Main castings of machine are of Meehanite, spindles of hardened tool steel or tough S A E 3140 steel.

## Blue Book Quiz Answers

(See Page 210 for Quiz Questions)

1—Greenfield Tap & Die Corp., Greenfield, Mass.

2—Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, O.

3—Ex-Cell-O Corp., Detroit, Mich. Also, Carboloy Co., Inc., of the same city. A similar type machine is also offered by Hammond Machinery Builders, Inc., Kalamazoo, Mich.

4—Sunnen Products Co., 7945 Manchester Ave., St. Louis, Mo.

5—Sommer & Adams Co., Cleveland, Ohio.

6—Allen Mfg. Co., Hartford, Conn.

7—Harvill Aircraft Die Casting Corp., 6253 Century Blvd., Los Angeles, Cal.

8—Davis Boring Tool Div., Larkin Packer Co., Inc., St. Louis, Mo.

9—Ahlberg Bearing Co., 3009 W. 47th St., Chicago, Ill.

10—Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

11—A universal head such as made by Halco Products Co., 14230 Birwood Ave., Detroit, Mich.

12—Paddock Tool Co., 1418 Walnut St., Kansas City, Mo.

13—R and L Tools, 2827 Bristol St., Nicetown, Philadelphia, Pa.

14—Rivett Lathe & Grinder, Inc., Brighton, Boston, Mass.

15—Per-Fect-O Boring Bars, made by Van Norman Machine Tool Co., Springfield, Mass.

16—Continental Tool Div., Ex-Cell-O Corp., Detroit, Mich., Continental Counterbores.

17—Scully-Jones & Co., 1901 So. Rockwell St., Chicago, Ill.

18—Liberty Planers, Inc., 1001 Waller Ave., Hamilton, Ohio.

19—Machine Products Corp., 6767 E. McNichols Rd., Detroit, Mich.

20—Gray Portable Controlled Flow Coolant Pump offered by Gray Mills Co., 215 W. Ontario St., Chicago, Ill.

21—Nicholson File Co., Providence, R. I.

22—Charles L. Jarvis Co., Middletown, Conn.

23—Upton Electric Salt Bath Furnace Div., 7454 Melville at Green, Detroit, Mich.

24—Cleveland Tool Engineering Co., 9200 Detroit Ave., Cleveland, Ohio.

25—Black "Hardsteel" drill made by Black Drill Co., 5005 Euclid Ave., Cleveland, O.

**PRODUCTIMETERS**

*for First Line Defense*

GIVE **ACCURATE** PRODUCTION FIGURES..on

| | |
|---|---|
| Punch Presses | Drop Presses |
| Forming Machines | Hydraulic Presses |
| Embossing Presses | Dieing Machines |
| Power Squaring Machines | Press and Bending Brakes |

Application shows Model 5-H-1-2-L Heavy Duty Productimeter...forward stroke...Tumbler Lock Reset.

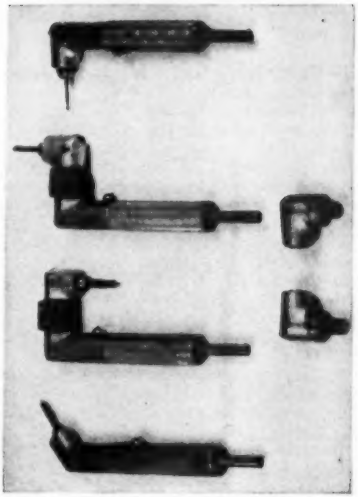
*WRITE FOR NEW CATALOG!*

DURANT MANUFACTURING CO.

1929 N. Buffum Street 180 Eddy Street

## Useful Angle Tool Attachments Introduced

An extensive line of angle tool attachments is announced by the Machinery Sales and Engineering Co., 914 Citizens Trust Bldg., Fort Wayne, Ind. It is asserted that these Invincible attachments will convert ordinary portable drills into universal tools in a few minutes. A few models of one type are shown in the illustration.



A wide variety of sizes and designs incorporating various angles makes it possible to reach otherwise inaccessible spots for drilling, tapping, screw driving, grinding, milling, or other operations.

It is pointed out that these attachments often make possible substantial savings in time when repairing machinery and also on many types of assembly and construction work. A few suggested uses are: — drilling bolster plates and rams, drilling flanges as on gun mounts, building and repairing airplanes, pontoons, wings, fuselages, etc.

**YOU NEED THIS RACK IN YOUR TOOL ROOM**

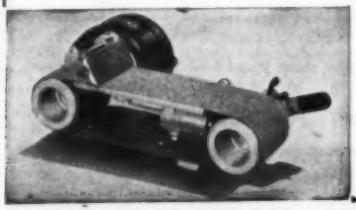
4 arms, 51" high, stacks 10,000 lbs. flat or round stock, 5 arms 57" high, 12,000 lbs. Less weight capacity for tubes or pipes. 3 stands for 20' lengths; 2 for 12' or shorter. Use against wall or back to back in center of room. Cost is small, value big.

*Write for circular and prices.*

**WM. S. YOHE SUPPLY CO.**
503 Mahoning Rd. N. E., Canton, Ohio

Wrigraph
PRECISION
DRAFTING MACHINE
Brief Case Size Illustrated.
New large INDUSTRO
Drafters available — tubular arm, ball-bearing machines. Complete range of sizes up to 36"x48".
Free trial offer and catalog on request.
Write for literature and prices on Larger Models
L·G·WRIGHT, INC.

*AN INEXPENSIVE* **ABRASIVE BAND GRINDER**



*"Built Like A Machine Tool"*

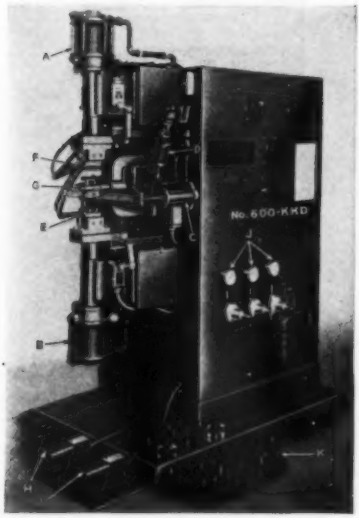
The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on belt. Ball bearing throughout, equipped with Alemite lubrication, complete with grease gun.

*Write for illustrated folder on this and other styles and sizes.*

**WALLS SALES CORP.**
96 Warren St., New York, N. Y.

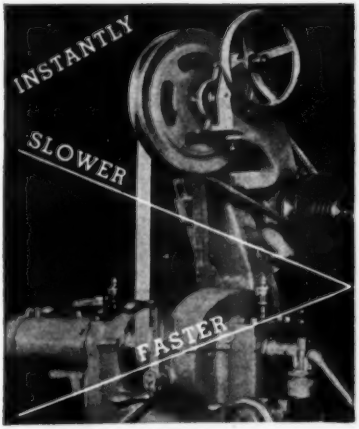
## Air-Operated Projection Welder

Eisler Engineering Co., Inc. Newark, New Jersey announces a new 600-KKD unit. It is arranged with special welding jigs and fixtures for welding fins to steel tubing. No individual jig is needed for loading the work. There are 56 points of heat control and the transformer secondary, welding dies, and mandrel are water cooled throughout.




The rotating mandrel is operated by air with automatic control. The main features are designated by letters: A-Air cylinder for upper welding die. B-Air cylinder for lower welding die. C-Air cylinder for the ejector mechanism. D-Air cylinder for indexing the rotating mandrel. E-Lower welding die. F-Upper welding die. G-Mandrel. H-Pedal for actuating ejecting mechanism. I-Pedal for actuating cylinders A and B. J-Pressure gauges—For A & B cylinders, C cylinder, and D cylinder. K-Finished product.

Pressure for each set of air cylinders can be regulated individually to meet any specific requirement. Machine is


*Given Vari-Speed Motor Drive operating on No. 4 W & S Turret Lathe*

**HAIR-LINE SPEED CONTROL**

Power your old machine tools with Given Vari-Speed Drives and get the benefits of instant speed changes while operating. No belt or gear shifting. Dynamic balancing eliminates vibration. No tool marks. 30% *increased speed range*. Exactly right speed for each work piece. Use carbide tools. Increase production. Improve quality of work. Raise safety level.

Precision built. Engineered by machinery experts. A size for every tool—1 to 7½ h.p. Sold on approval. Money back if not satisfied in 60 days.

*Send for Bulletin*

**GIVEN MACHINERY COMPANY**
2016 SANTA FE AVENUE
LOS ANGELES, CALIFORNIA

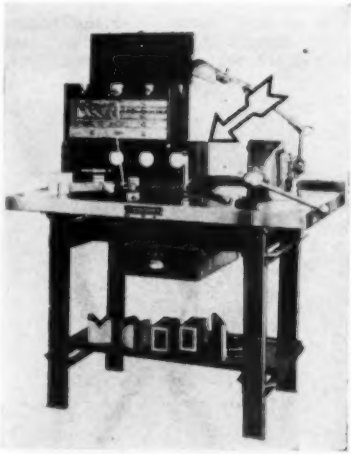
**GIVEN VARI-SPEED DRIVE**

so wired that ejector mechanism cannot operate while welding dies are in motion, nor will welding dies operate while ejector mechanism is in motion. The actual welding time is controlled by automatic timing equipment.

Three separate fins are spot welded to each steel tube. Production reported is approximately 200 finished pieces per hour.

## Handy Tool Box Shelf

What to do with the tool box on the work bench has been answered by The Challenge Machinery Co., Grand Haven, Mich., by designing a new tool box shelf for use on Challenge Cast-Iron Top Benches.



This new shelf provides a convenient place for the tool box within easy reach of the worker, yet out of the way of his work. Being up above the bench, tool box drawers can be opened without moving anything on bench top, which then becomes almost entirely available as a work space.

Tool box shelf can be attached to any new or old Challenge Cast-Iron Top Bench. These benches are built of iron and steel and solidly braced to remain rigid under heavy pounding, shocks, and pressure. The cast-iron tops are preferred to wood in modern plants, because they do not shrink, splinter, or present a fire hazard, and are more accurate. The top surface and sides are planed at exact right angles, and the underside is heavily ribbed for reinforcement. Solid corners help to keep surface firm. Two full length braces under table, equipped with levelling screws, assure a level working surface.


KUTMORE HIGH SPEED

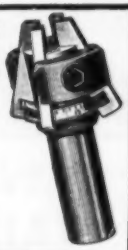
ADJUSTABLE HOLLOW MILLS with MICROMETER ADJUSTMENT.

Cutting capacities up to 2".

*Ask for Catalog No. 15*

CARL WIRTH & SON

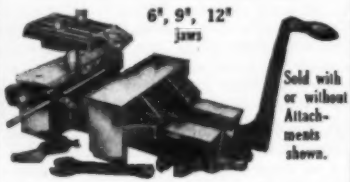
1625 Clinton Ave. No.
Rochester, New York



*QUICK SHIPMENT*

GRAHAM MULTI-PURPOSE VISE

6", 9", 12" jaws



Sold with or without Attachments shown.

These famous machine vises, precision finished to accurate parallels and right angles for use on sides or end as well as base, can be shipped promptly.

—AND SHIPPING FROM STOCK:

Drill Speeders, increase speed 3 times

Knurl Holders, fit lathe turret.

*Request circulars*

GRAHAM MFG. CO.

52 Bridge St. East Greenwich, R. I.

## Vernon 12" Shaper

Engineered to meet tool room and industrial demands for a shaper having wide speed ranges and capable of working to close tolerances, the Vernon incorporates both features in a compact, easily operated unit. The heavily ribbed Vee type ram is designed with 60% bearing surface when ram is at extreme stroke and completely forward in ram bearings.

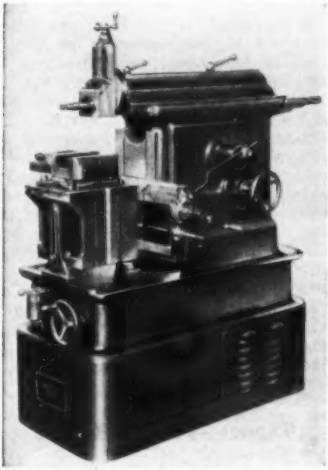


Table is of box type construction with 3 Tee slots on top and 2 on the side. A Vee slot for shaping bars is also provided. The cross feed is automatic in both directions, cam actuated, and is accurately synchronized with return stroke of ram. Seven feeds are available, ranging from .0025" to .0175".

An infinite number of speeds within a range of 15 to 170 strokes a minute is made possible by the hand-wheel controlled variable speed drive. The quick change gear box and drive pinion is built as an integral unit. Heat treated alloy steel gears, ball bearing mounted and running in oil enable gear changes to be easily made by sliding the inching wheel in and out. All gear shafts are hardened and ground.

Helical type bull gear is mounted on large Timken Tapered roller bearings,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TODAY . . Vital to DEFENSE

CLEMENTS

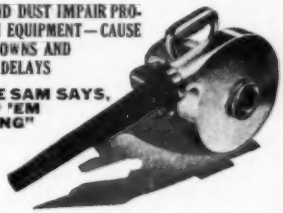
CADILLAC

Portable Electric

BLOWERS & SUCTION CLEANERS

DIRT AND DUST IMPAIR PRODUCTION EQUIPMENT—CAUSE BREAKDOWNS AND COSTLY DELAYS

UNCLE SAM SAYS, "KEEP 'EM ROLLING"



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*Write for complete details—TODAY*

CLEMENTS MFG. CO.

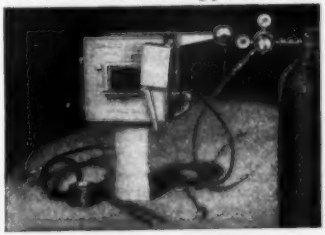
6651 S. NARRAGANSETT AVE., CHICAGO, ILL.



"Stark"

"ELECTROBLAST"

No. 2 Full Muffle Type Furnace



High grade insulated Furnace. Silicon Carbide Muffle 7"x4½"x3½". Complete with built in blower ready to run, $138. Blast actuated by powerful Universal ball bearing motor. May be had as a Hydrogen Brazing Furnace complete with Pyrometer as illustrated, $260. Unit will reach 2350°F. in less than an hour at 10c per hour. Indispensable for small intermittent jobs. Write for descriptive literature.

STARK TOOL CO.

*Originators of the American Bench Lathe*

Est. 1862 Waltham, Mass.

permitting adjustment for wear and absorbing radial and thrust loads. The bull gear is so positioned in relation to its bearings that overhang is kept to a minimum. Center distance between bull gear and pinion can be adjusted for tooth wear.

Other outstanding features include friction-type dials for quick adjustment, accurately graduated to .001". Bronze and felt wipers are provided for all dovetails. Tool head has a tapered gib and tool post is of forged steel.

Maximum length of stroke is 12 ⅞" and Length of ram is 31". Ram return ratio is 3:2. Cross feed (automatic in either direction) is 11 ½". Vertical Travel is 7 ½". Top Dimensions are 10 1/32"x12" and Depth is 10 1/32". Vertical travel of head is 3 ½", size of tool post slot is 19/32x1 15/16" and Diameter of Head is 6 ½". Width of vise jaws is 7", and Depth of jaws is 1½". Jaws open 5¾" and height over table is 4", a 60 cycle, 1150 r.p.m. 1 h.p. motor is used. Floor space required is 24 ¾"x52 ⅛" and weight is 1060 lbs.

## Machine Tool Electrical Standards

New electrical standards for that industry were adopted at the meeting of the National Machine Tool Builders' Ass'n. in Chicago, Oct. 14th. Members of the Committee on Electrical Problems are:—B. P. Graves, Brown & Sharpe Mfg. Co., Chairman; Robert S. Elberty, Landis Tool Co., Don K. Frost, Mattison Machine Works, John E. Doran, G. A. Gray Co., George A. Spohn, General Machinery Corp., and L. Michelson, Gleason Works.

The standards were written by the Committee on Electrical Problems, submitted to members for suggestions and changes, and discussed at a joint meeting of machine tool electrical engineers and electrical engineers of large customer companies at Detroit in April. After further revision they have been accepted by the members, of the Ass'n. and approved by the Board of Directors as an Ass'n. Standard.

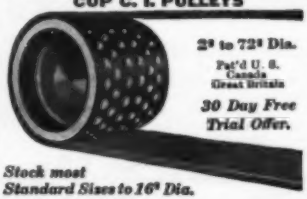
Purpose of the Machine Tool Electrical Standards is two-fold:—to relieve customers of the necessity of writing elaborate electrical specifications of their own and to give them the assurance that the machine tools they buy will be properly wired. The Standards will have the incidental advantage of expediting the assembly of machine tools by removing the need of making every machine tool a special wiring job to meet special specifications. A series of conferences has been held with the Article 430 Technical Sub-Committee to arrange such changes in the National Electrical Code as are necessary to safeguard machine tool operators. Copies of the new Standards are available from the Ass'n. Headquarters, 10525 Carnegie Ave., Cleveland, Ohio.

## Tapper—Fixture Folder

A new illustrated bulletin has been issued by R. G. Haskins Company, 617 S. California Ave., Chicago, Ill., covering semi-automatic tapping fixtures, the use of which makes possible higher tapping production schedules. Many photos are shown of typical tapping set-ups and fixtures.


NO BELT SLIPS WITH VACUUM CUP C. I. PULLEYS

Shut Off Expense Caused by Slippage
You Save Money on Every Installation



2" to 72" Dia.
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*30 Day Free Trial Offer.*
*Stock most Standard Sizes to 16" Dia.*

NEW LOW PRICED PRODUCTION LINE
SOME OF SIZES LISTED BELOW **Send for List—On the Shelf**

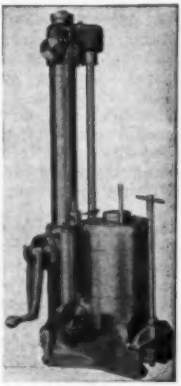
| Dia. | Face | Price | Dia. | Face | Price |
|---|---|---|---|---|---|
| 2 " | x2½" | $1.25 | 4 " | x3½" | $2.85 |
| 2½" | x2½" | 1.45 | 4½" | x5½" | 3.95 |
| 3 " | x3½" | 2.25 | 5 " | x4½" | 4.25 |
| 3½" | x3½" | 2.55 | 6 " | x5 " | 4.75 |

Increase your Production

We supply Fractional Dia. and Face Pulleys—From large casting stock.

**VACUUM CUP METAL PULLEY CO., INC.**
12535 Grand River Ave., Detroit, Mich.

## Van Norman "777" Boring Bar



The "Per-Fect-O Boring Bar, for 12 years a sales leader of the Company's Automotive Division, is now available to all the metal-working industries. Known in the automotive service trade as one of the most profitable items of shop equipment, this boring bar according to the manufacturer has won favor through its ability to rebore engine cylinders to factory-accuracy in one cut, without need for a second cut or honing.

Now, to metal-working industry, these Van Norman bars offer new speed, ease and accuracy in boring all grades of cast iron, brass, bronze and aluminum. Bars are easy to set up and operate, for all six models are portable and can be readily taken to the work or mounted on fixtures for continuous production. Automatic shut-off frees operator for other work while bar is running. It is explained that an exclusive feature of every "Per-Fect-O" is the solid support given to the single flycutter by the 4 patented "Catspaws", non-revolving, expansible and contractible supports that center the bar and provide a steady rest.

The six "Per-Fect-O" sizes cover a range of diameters from 1.900" to 9.050", and depths from 10" to 30". Shown is No. 777, heavy duty, yet light enough so that one man can handle it without a helper. Capacity of No. 777 is 2.6" to 5.343 diameter, depth to 14". Especially note-worthy is the fact in many cases, "Per-Fect-O" Boring Bars will perform operations now requiring heavy and expensive boring mills. Full details on any or all of the 6 Van Norman "Per-Fect-Os" may be had for the asking, from the Van Norman Machine Tool Co., Springfield, Mass.


SECOMET

RESINOID BONDED

DIAMOND WHEELS

FOR

• FASTER CUTTING

• BETTER WORK

• LONGER LIFE

CEMENTED Carbide tools can be sharpened faster, more accurately and economically with SECOMET DIAMOND WHEELS.

They are made of the finest quality bortz and resinoid bond.

A wide range of standardized sizes and types of diamond wheels is on hand enabling you to select a suitable wheel to meet any ordinary requirements —for extraordinary results.

Write for new price list.

J. K. SMIT AND SONS, INC.

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Look to EASTERN for COOLANT PUMPS

Eastern Engineering Company, manufacturer of world-famous specialized pumps, offers a complete line of Coolant models in all sizes and types—each with the rugged, trouble-free dependability which has made the name of Eastern respected all over the world.

*Write for complete information and prices.*

Proven performance—Continually growing demand for Eastern Coolant Pumps has made necessary an expansion of our production facilities. Increased capacity enables us to maintain prompt shipments.

EASTERN ENGINEERING COMPANY
42 Fox St., New Haven, Conn.


## Lincoln Opposes Price Increases

We hear much talk these days of soaring prices and inflation. It is a refreshing change to read a pledge like that of President J. F. Lincoln of The Lincoln Electric Co., in the October issue. Recalling his announced statement of policy of two years ago, Mr. Lincoln emphasized the fact that his Company has actually reduced selling prices by more than 6%, in the face of rising labor and material costs.

In his previous statement, Mr. Lincoln stressed the fact that other wars have brought inflation, followed by unemployment and depression after peace was achieved. He asserts that much of this post-war trouble can be averted by a more foresighted policy on the part of manufacturers and distributors. Price inflation by the seller when he has a dominant position invariably results in adverse reaction with deflation, depression and suffering.

Before the start of another inflationary cycle of prices, Mr. Lincoln pledged that his Company would, as far as possible, maintain existing prices. Further, as materials rise in price, Mr. Lincoln pledged his Company not to raise selling prices more than the bare increase in the cost of raw materials and labor going into Lincoln products. In addition, Mr. Lincoln promised to pass on to customers, any reductions in cost made possible by better manufacturing methods, wider distribution and technical advances in production . . . which has already been done.

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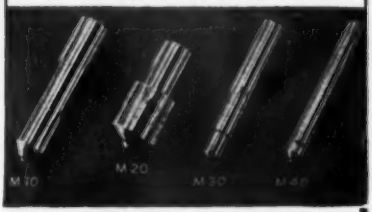


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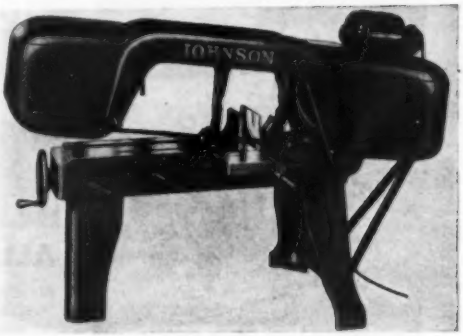
**BALDOR**
BALL BEARING **GRINDERS**

## Johnson Metal Cutting Band Saw




A new metal cutting band saw has been developed by Johnson Machine Works, Inc., 310 W. Washington St., Albion Mich.

It features a box type frame which houses the band wheels. Welded steel hangers carry the band wheel assemblies and the hangers are substantially bolted to the frame. The frame design provides for three point suspension which assures accurate operation even when machine is used on uneven floor surfaces.

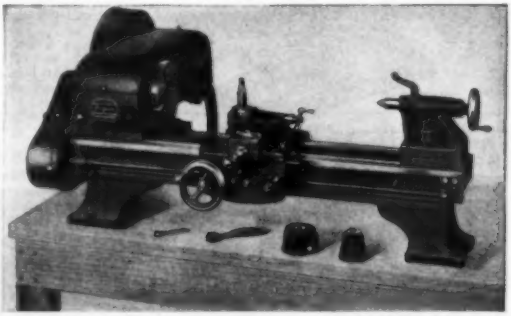
Power is transmitted through a worm and gear reduction to rim of wheel, eliminating chance of chatter. All shafts are ball bearing mounted and the gears run in oil.

The entire blade section, excepting the teeth, is supported on wide guide rolls which make for accuracy. Band wheels are 16" in diameter, providing large drive area and overcoming slippage.

The wide bed provides generous working space and is engineered for rigidity. Power is supplied by a ball bearing motor, capable of operating in a tilted position. Four speeds are available, permitting efficient handling of various kinds and types of metal. A bolt-action stock stop recedes during the cut, preventing the cut section from binding and damaging blade. Positive feed is provided by an effective hydraulic control of simple design. A quick acting vise is provided.

Blades are 11'3"x21-gauge x ¾" and may be had with from 6 to 32 teeth per inch. Height to top of table is 24½". Overall height is 39½". Floor space required is 66"x32". Capacity is stated to be 10" rounds and 18" flats.

## Logan Offers Bench Lathe



A new bench model of the Logan 10" swing lathe is now available. It will handle stock up to 24" between centers and the bed is 6-15/16" wide by 43⅛" long. Headstock is equipped with precision pre-loaded ball bearings. Power longitudinal and cross feeds are provided. Threads from 4 to 216 per inch can be cut. Head and countershaft are fully enclosed and guarded. Prismatic V and flat ways are provided.

Manufacturers are the Logan Engineering Co., Chicago, Ill.

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- ☐Lathes, auto.

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- ☐Lathes, engine
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- ☐Lathes, polishing & buffing
- ☐Lathes, shell
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- ☐Lathes, spinning
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***Write directly to those offering the machine for sale,*** **for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, Chicago, making known your wants on either new or used machinery and the publisher will gladly pass them along to the advertisers.**

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Gear hobbers, G. & E. & Shuchardt & Schutte.
Gear hobbers, Barber-Colman, No. 2.
Gear shaper, No. 6 Fellows.
Grinders Brown & Sharpe No. 1, 2, universal.
Grinders, Bryant No. 6 internal.
Grinder, Churchill-Morgan internal.
Grinders, No. 55, 60, 65, Heald internal.
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Lathes, 16x8, 18x8, 18x10', quick change.
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Lathe, 24x10' Crawford, 3 step cone, heavy.
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Miller, Cincinnati No. 4 plain.
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Miller, Cincinnati No. 3 Universal.
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Turret lathe, Millholland, 1¼" friction head.
Turret lathe, W. & S. No. 2, 6.
Turret lathe, J. & L., 2½, 3½"
Turret lathe, P. & W. 22x26" grd. hd., s.p.d.
Hydraulic pumps, presses, accumulators.

**Factory & Mill Supply Co., Inc.**
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Milling machine, No. 2-M Potter & Johnson, auto.
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Chip separator, 1 bu., motor drive, less motor.
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Grinder, Bryant No. 10A.
Lathe, 15x6 Reed Prentice, grd. hd., m. d., t. a.
Lathe, 26"x12' Schumacher-Boye, quick change.
Mill, Oesterlein No. 1½ plain.
Pipe bender, Wallace, 2" cap.
Radial drill, American 3'.
Roll, power, 8' 10 ga. power elevating top roll, m.d.
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Tapping machine, Garvin No. 2.
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Welder, G. E. arc, 400 amp., 3 man control.
Please send us your inquiries.

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**602 W. Lake St., - - - Chicago, Ill.**

GUN DRILLS
1 Pratt & Whitney & 5 Bausch, 2 spindle horiz. 1½" cap, size 13x9'8" bed, swing 7".
Boring bar, 3", Beaman & Smith horiz., floor type, gear box, motor drive.
Broach, LaPointe-Hudson, No. 3, m. d, cut keyways to 1¾", bro. sq. holes to 3½" across flats, 54" stroke.
Lathe, Johnson, 21"x14', gd. hd., 2 steady rests, face plate, arr. m.d.
Lathe, Fitchburg 3½"x60" low swing, gd. hd., 2 carr.
Lathe, 20"x10' Whitcomb-B., gd. hd., m.d., complete.
Lathe, Harrington 48" gap, 15' between centers when bed is open.
Pipe threading machine, cap. 2" to 8" arr. m. d., including 8 dies, cutting-off attach. & oil pump.
Planer, 26"x26"x6' Hamilton, 1 head on cross rail.
Planer, 36"x36"x16', 6" bed, Gray, 2 hds. on rail.
Turret lathe, J & L, 2½" spdl., 16" swing, single pul. drive, geared head, extra tools.

**H. J. Camden**
**825 Hibbard Ave., Jackson, Michigan**

Automatic lathes, 14"x19" Fay, equipped for center work. (4 only). Immediate delivery.

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We have in stock for rent, four 2" Cleveland automatic screw machines with air cylinder, rotary feed, and 1¼" Cleveland automatic screw machine, bar feed, to any individual or firm for only $25.00 per week per machine.

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QUALITY MACHINERY since 1916

Automatics, No. 5A Potter & Johnson, (2).
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Grinder, 6x18 Quickway, motor driven, external.
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Lathe, 24x14 New Haven, loose change.
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Planer, 26x5 New Haven, m.d.
Press, 200 ton Elmes hydraulic.
Shaper, 26" Stockbridge, single pulley drive.
Shaper, 24" Smith & Mills, cone drive.
Shaper, 7" Rhodes, cone drive.

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**Machine Tools Sales Company**

**513 N. 17th St., Philadelphia, Pa.**

511' 15x9x10 Chi. posu. O-CB, mtr. dr.
Auto., ¾" Model A Cleveland, aerial over 30,000.
Bolt cutter, 3" Landis, grd. motor drive.
Crane, 15 ton, 40' span, Niles OET.
Crane, 5 ton, 28' 1½" span, Roeper.
Drill, radial, 8' Sellers, m.d.
Grinder, 48"x84" Diamond face, hyd. feed, a. c. m. d.
Grinder, 10"x36" Landis pl. self-cont.
Grinder, No. 2 Landis univ. 12"x32" c-shaft.
Grinder, 7-5/8x16" Sichel, hob.
Lathe, axle, Bridgeford, dbl. end, center dr., q.c.g.
Lathe, 38"x14' centers, Fifield, single back geared.
Lathe, 33"x10' Centers Fifield, triple geared.
Lathe, 31"x16' Centers Fifield, triple geared.
Lathe, 27"x38' Lodge & Shipley, m.d.
Lathe, 26"x14' Bridgeford pl. turn., m. d.
Lathe, 26"x8' Prentice, gd. hd.
Lathes, 20"x6' Springfield mfg., (2).
Lathe, 4"x84" Lo-Swing, s. p. d.
Lathes, No. 2 Warner & Swasey, cone.
Miller, No. 3½ 72" Pratt & W. dble. spdl.
Miller, No. 2 M Potter & J. mfg., s.p.d.
Miller, thd. 11"x24' Milled Screw Co.
Miller, No. 23—6" Smalley, general thread, 6" sp.
Planer, 68"x50"x10' Cincinnati widened pattern.
Planer, 54"x54"x15' 6" Sellers, 3 heads.
36"x36"x14' Hamilton, 3 hds.
Planer, 22' No. 6 Hilles & J., plate.
Punch, No. 6 Hilles & J., 62" throat.
Slotters, 18" Sellers, crank, m. d., (2).
Slotter, 14" Betts, crank.
Slotter, 12" Bement, crank.
Strip mill, 16"x24" 2-hi Duplex, cold.
Strip mill, 16"x24" Bliss 2-hi., cold.
Testing machine, 100,000 lbs Tinius Olsen universal.
Tire setter, No. 6 West hydr., 18 cyl. 30" x 63" with Triplex pump.
Trucks, 6000 lb. cap. Tier Lift Trucks, Baker, Automatic Transportation, Lakewood (3).
Saw, No. 510—42" Newton, cold, m. d.
Saw, 6"x6" Peerless hack.

### FOR SALE BY

**Reliance Machinery Sales Company**

**1407 Brighton Place, N.S. Pittsburgh, Pa**

Air compressors, 139 and 450 cu. ft.
Brake, press, 6'x16 ga. Robinson, toggle.
Grinder, 12x32" Bath univ.
Grinder, No. 14 Besley double disc, 26" discs.
Hammers, 50 lb. Mayer, 40 lb. Bradley helve.
Lathe, 36"x18' New Haven, plain change.
Lathe, 27"x15' Prentice, taper, arr. m. d.
Hammers, 250 and 400 lb. board drop.
Miller, 30"x10' Newton slab, m. d.
Miller, No. 2 Cincinnati universal, cone drive.
Press, No. 82-C Toledo dbl. crank, 44" wide, 5" shaft, 2" stroke, m. d.
Pump, Goulds centrifugal, 3 stage, 250 g.p.m. against 347' head, m. d., 3-60-220 v.
Punch, 48" throat Whiting, 1" thru 1", arch. jaw.
Shaper, 24" Smith & Mills, b.g., crank.
Shaper, 28" American, b. g. crank, cone.
Slotter, 15" Bement, crank, 36" rot. table.
Swaging machine, No. 5 Etna, cap. 3" tubes.

What do you need? What have you for sale?

---

**Foster Machinery Co.**

**3982 Bluestone Rd. Cleveland, O.**

Bulldozer, Williams & White No. 4, double end.
Forging roll, No. O.C. Ajax.
Lathe, 14x6 Monarch, q. c. g.
Punch, Long & Alstatter, 36" throat, 1¾" cap. arch jaw,
Saw, 6" Newton, cold.

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**Wm. C. Johnson & Sons Machy. Co.**

**1211 Hadley St., St. Louis, Mo.**

Air compressors, 15 in stock.
Bolt threaders, 1", 1¼" & 2" Acme.
Brake, press, L&N, 10', 10 ga.
Drill, Natco 13 spindle, No. 1 taper.
Drill, No. 2 Fox, 6 spindles.
Drills, radial, Dreses, 3' & 4'.
Drills, radial, Fosdick, 3'.
Drills, radial, Drillmaster, new.
Forging machine, Ajax 2".
Grinders, 10"x30" Landis.
Grinder, Walker 12" rotary.
Hammers, 300 lb. Beaudry, 75 lb. Bradley, 50 & 100 lb. Little Giant.
Lathes, 14"x6' Monarch, q.c.g.
Lathes, 14"x8' American, q.c.g.
Lathe, 18"x8' Amer. q. c. g.
Lathes, 20x8' LeBlond, q.c.g.
Lathes, 24x16' Lodge & Shipley, q.c.g.
Lathes, 28–48x18' McCabe 2 spindle.
Lathe, 32"x14' Schumacher & Boye.
Lathes, 82" Niles locomotive wheel.
Miller, No. 3 Kempsmith.
Miller, No. 3 Knight vertical.
Miller, No. 0 Steptoe.
Miller, No. 3½ Fox.
Pipe machines, 2"—4"—6"—8"—12".
Pipe machine, 2" Landis.
Planer, Cincinnati 2 heads, m. d.
Planer, 48"x48"x12' New Haven.
Potter & Johnson 5A auto.
Press, wheel, 400 ton 84" Niles.
Press, wheel, 200 ton 48" Niles.
Punches, shears, bulldozers.
Roll, plate straightening, H. & J. No. 2, like new.
Saws, 6x6 Peerless, 12x15 Racine.
Scrap baler Logeman hydraulic.
Shapers, 12"—16"—20"—24".

Large stock guaranteed electric motors. Any size.

## USED AND REBUILT MACHINERY

## FOR SALE BY

**Lang Machinery Company** **28th St. & A. V. R. R.** **Pittsburgh, Pa.**

Air compressors, Ingersoll-Rand XB-2, 600, 888, 1200 & 1500 cu. ft. 100 lb. pressure, motor drive.
Air compressor, N-S03 Chicago, 492 d.f., oil dr.
Air compressor, Ing. Rand ER-1 148 c. f., b.d.
Air comp. 14"x12" Ing. Rand "ER-1", 464 c. f., m. d.
Bolt cutter, 1" Landis, 1½"-3" sgl. hd., b. d.
Bolt cutters, 1" Acme, Landis hds., 2 & 3 spdl.
Boring mill, 36" Bridgeport, grd. feeds, m. d.
Boring mill, horiz. Barret 3½" b.d.
Brake, 8' x12 gauge D & K leaf type, s.p.d.
Bulldozers, No. 2 & No. 4 Wms. & White, m.d.
Crane, 5 ton OET, 43'6" span, m.d.
Column facer, 30" dia. Espen Lucas, b.d.
Cut-off machine, 16" Treadwell, m.d.
Drill, 2-spindle Woodward-Rogers, m. d.
Drill, mult. No. 3 Rockford 3 spdl., s.p.d.
Drill, mult. 10 spindle D-12 Fox, b. d.
Drill, radial, 2½" Mueller, t.a., m.d.
Drill, radial, 3½" Prentice, t. a., b. d.
Drill, radial, 3" Bickford, t. a., m. d.
Drills, upright, 11" to 34", b. d. & m. d.
Gear cutter, spur, 30"x16", B. & E., m. d,
Gear cutter, 40"x12" G & E, s.p.d.
Gear cutter, spur, 84" Newark, m. d.
Gear planer, 36" Gleason, bevel, m.d.
Gear planer, 54" Gleason, bevel, m. d.
Generator, 100 KW Westinghouse d. c., 125 v. b. d.
Generator, 150 KW Jeffrey, d. c. 250 v. b. d.
Grinder, centerless No. 3 Cincinnati, m.d.
Grinder, dbl. end, Standard Elec. 7½ H. P. 220 v. d. c.
Grinder, dbl. end, 24" Marschke, m.d.
Grinder, drill, No. 5 Oliver. m.d.
Grinder, gear tooth, Detroit No. D-12, m. d.
Grinder, internal cylinder, No. 5 Landis, b. d.
Grinder, tool & cutter, Ingersoll inserted tooth, m.d.
Grinder, univ., No. 5 B. & S., 20"x72", b. d.
Grinder, worm-hob, Pfauter "FS", b.d.
Grinder, cyl., 10"x30" Landis, b.d.
Grinder, No. 60 Heald, b. d.
Hammer, power, No. 3-B Nazel, m.d.
Hammer, power, 300-lb. Bradley, upright helve.
Hammer, power, No. 4 Beaudry, b. d.
Hammer, 1500 lb. Bliss, board drop, b.d.
Hammers, steam drop, 400-lb. to 8000-lbs
Hammers, steam forging, 800 lbs.—6000 lbs.
Keyseater, No. 3½ Baker, 3½", m. d.
Lathe, 13"x6' Smith, semi-q. c. g., d. b. g., b. d.
Lathe, 14"x6' Rockford, semi-q. c. g., d. b. g., b. d.
Lathe, 15"x10' Sebastian, p. c. g., s. b. g., b. d.
Lathe, 15"—24"x8' Sebastian grd. head, m. d.
Lathe, 16"x8' Pratt-Whitney, p. c. g., b. d.
Lathe, 16"x10' Bradford, grd. head, q. c. g., m. d.
Lathe, 16"x24"x8' So. Bend, gap, b.d.
Lathe, 17"x6' LeBlond, automobile, b. d.
Lathe, 17"x8' LeBlond, q.c.g., d.b.g., b. d.
Lathe, 18"x6' American, q. c. g., d. b. g., t. a., b. d.
Lathe, 18"x6' Prentice, p. c. g., t. a., b. d.
Lathe, grd. hd., 18"x8' American, t.a., m.d.
Lathe, 18"x8' Prentice turning, d. b. g., p. c. g., b. d.
Lathe, 18"x10' Hendey, q. c. g., b. d.
Lathe, 20"x8' Reed, p.c.g., s.b.g., b.d.
Lathe, 20"x10' Hamilton g. d. head, q. c. g., s. p. d.
Lathe, 24"x16' Bradford, t.a., b.d.
Lathe, 24"x12' American grd. head, m.d.
Lathe, 27"x11' LeBlond, grd. hd., q.c.g., d.b.g., m.d.
Lathe, 27"x12' Putnam, hvy. duty, q. c. g., d.b.g., b. d.
Lathe, 32"x16' Schumacher & Boye, p.c.g., d.b.g., b.d.
Lathe, 36"x18' American, p. c. g., t. a., b. d.
Lathe, 36"x24'-6" New Haven, p. c. g., b. d.
Lathe, 42"x22' American, b.d.
Lathe, 42"x 20' Springfield trip. grd., p. c. g. b. d.
Lathe, 46" x 17'-7" Pond, triple grd., p.c.g., b.d.
Lathe, 48"x22½" Johnson, trip.gd. int .face pl. dr. b.d.
Lathe, 48"x26½" Johnson, trip. gd. int. face pl. dr. b.d.
Lathe, 60"x30' Niles, b. gb.d.
Lathe, gun boring, 3 bar, cap. hole 12"x40', m. d.
Lathe, turret, 16" Warner-Swasey, h.s. 1-7/16", b.d.
Lathe, turret, 16" Reed, h.s., 1½", p. f., b. d.
Lathe, turret, 24"x24" Jones-Lamson, s.p.d.
Lathe, turret, 26" Libby "C", h.s. 7½", s.p.d.
Leveller, 84" Bertsch 7 rolls, m. d.
Miller, Vert. Taylor & Fenn, tbl. 20½"x6", m. d.
Pickling machine, Mesta, 8-12' arms.
Pipe machines, 8" Williams, 2½" to 8" motor drive.
Planer, 24"x24"x8' New Haven, 1 head, b.d.
Planer, 30"x30"x8' Cincinnati., 2 heads, m.d.
Planer, 36"x36"x10' American, 2 heads, m. d.
Planer, 36"x36"x11' Sellers, 2 heads, rev. m.d.
Planer, 54"x54"x20' Pond, m. d.
Press, double acting, No. 1 Bliss, roller feed.
Press, dbl. cr., 96-F Toledo, 12" str., Bolster 65"x124"
Press, hydraulic, 100 ton, Watson-Stillman, m. d.
Press, 250 ton Baldwin-Southwark 4-post.
Press, forging, 1500 ton Farrell-Birmingham, m.d.
Press, o. b. i. No. 65-C Bliss, stroke 5".
Press, perforating, No. 5 V & O, str. 4", dbl. crk., b.d.
Press, straightening, Hunt hydraulic, 50 tons.
Profiler, No. E3, Keller, motor drive.
Pump, Worthington 9"x2"x12".
Punch, lever, No. 55 Niagara, 36" throat.
Punch, mult. 10' L & A, cap. 3/40 tons.
Punch & shear, No. 3 L & A, rap. act. ¼"-1",
Punch & s., No. 2 H. & J, d.e. thrt. 26", m.d., 1" thru 1½"
Punch & shear, Cleveland EF, 1¼" thru 1", m. d.
Punch & s., No. 3 H& J, d.e., thrt. 36", 1½" thru 1", m.d.
Punch & shear, Cleveland "G", 2" thru 1", m. d.
Punch & shear, dbl. end. No. 00 Covington, 2"-1", m.d.
Riveter, pneu., Hanna, 30 ton, 75" reach.
Riveter, pneu., Hanna, 80 ton, 126" reach.
Riveter, pneu., Hanna, 150 ton, 150" reach.
Saw, band Type JM Laidlaw, cap. 6", m. d.
Saw, band 26" Crescent, tilting tbl. 20"x24", b. d.
Saw, cold, Espen Lucas, blade 22", cap. 6" rd.
Saw, hack 8"x8" Racine, s.p.d.
Screw machine, No. 1 W. & S., cap. ½", b. d.
Shaper, draw-cut 48" Morton, m.d.
Shaper, traveling head, 50", Bement, m.d.
Shaper, 16" Cincinnati hi-duty, b.d.
Shear, allig. Pittsburgh, cap. 2"-2½", m. d.
Shear, allig. No. 7 United, 6" square, m. d.
Shear, alligator, No. 61 Carlin, 3" round high knife.
Shear, bar, Mesta 36"x1½", m. d.
Shear, circle, No. 05 Niagara, b. d
Shear, allig. No. 4 D&K, cap. 5", m.d.
Shear, plate, 72"x1½" United, m. d.
Shear, plate, 119"x1" Wheeling, gap. 15", m.d.
Shear, plate, 65"x1½" Lewis, thrt. 30", m.d.
Shear, plate, 10'x1" Pittsburgh, gap. 15½", m. d.
Shear, plate, 96"x1" Mesta, thrt. 25", m.d.
Shear, plate, 125"x3/16" Hyde Park, gap 18", m.d.
Shears, plate 156"x3/16 Hyde Park, gap 17", m. d. (2)
Shear, plate, 132"x1" Lewis, thrt. 36", m. d.
Shear, plate 156"x3/16" Standard, gap 15", m.d.
Shear, plate, 96"x1½" Morgan, m.d.
Shear, sq., 36"x½" United, b.d.
Shear, squaring, 72"x18 ga. Streine, m.d.
Shear, rot. No. 10-M Marshalltown throatless, 10 ga.
Slotter, 18" Bement, table 36" b. d.
Slotter, traveling, Morton, stroke 84", m.d.
Sprue Cutter, No. 7 Z & H, cap. 50 tons.
Upsetter, 4" Ajax, steel bed, m.d.
Upsetter, 2½" Acme, steel bed, m.d.
Vertical attachments, Nos. 1, 3 4 and 5 millers.
Straight ner, shape, No. 3 Sutton 2-way cap. 4½", m.d.
Tapping machine, duplex Garvin 2-X ¾" ½", n.d.
Thread Miller Smalley-General cap. 14"x3", m.d.
Welders 150 amps. and 200 amps. portable.

## USED AND REBUILT MACHINERY

### FOR SALE BY

### The Nutmeg State Machinery Corp.
### 1041-1051 State St., New Haven, Conn.

Grinder, Internal, Taylor & Fenn, self contained, complete, Excello spdle.
Grinder, Diamond No. 1 automatic surface, complete.
Grinders, Bryant No. 30, chucking, 35" swing, motor driven by 3 motors, (3).
Grinder, Cincinnati, 12"x36" universal.
Thread millers, Pratt & Whitney 6"x48", complete with gears, pumps, tanks, countershafts, (2).

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### Alex Zeeve & Company
### 2269 Woolworth Bldg., New York, N. Y.

Bolt threaders, 4" Landis, 2" Acme "Class A", 1¼" National.
Boring mills, vertical, 51" Bullard, 2 heads, m.d., 34" Rogers, spd.
Cylinder boring mill, horiz., 7" bar, swings 96" over bed.
Gear hobbers, 24" Rhenania; 18" Schuchardt-Schutte.
Hammers, power, 500 (2), 400 and 300 lb. Beaudry "Champion".
Hammer, steam, 250 lb. Niles-Bement-Pond, agle, fr.
Ironworker, comb.—No. MK-10 Pels, armor-plate, with coper portable, on wheels, ac-md., new in 1934.
Keyseaters, No. 3 & No. 2 Mitts-Merrill, No. 2 No. 1 and No. 0 Baker.
Lathes, engine—39"x20' Rahn-Mayer-Carpenter semi-q.c. 20"x12' H.S.&G., q.c.g.; 29"x16' Walcott, q.c.g., taper,; 24"x16' Whitcomb-Blaisdell, q. c. g., taper; 24"x11' Lehmann, 16 speed gd. hd., md, taper,; 21"x12' LeBlond, 12 speed gd. hd., m.d., taper.; 20"x10' Lodge & Shipley, q. c. g., bowl head, 16"x6' Kimball-Walcott, 12 spd. gd. hd. spd., others.
Planers, 36"x36"x14' Woodward-Powell, 1 rail head, 1 side hd.; 36"x36"x10' Pond, 2 rail hds., 2 side hds.
Roll angle bending—No. 7 Bertsch, 2"x2"x¾" cap. also bends tees, channel, and ¾", 1" & 1½" pipe.
Saw, metal-cutting band—No. 8 Marvel b. b., m. d.
Shaper, 16" Smith & Mills, vee-ram, gear-box m. d.
Shears, 8'x3/4" Lennox, rotary splitting, m.d., ¾" capacity Ryerson throatless, 60" Yoder rotary, 14 ga. cap, 30"x¼" Stoll squaring, a. c., m. d.
Tapper, No. 8 Gaterman pneu. oscillating, ¼"-¾" cap.
Turret lathe, 2"x26" Pratt & Whitney, b. g., hex turret, with cross-slide.

ALSO MANY OTHER TOOLS.

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### S. M. Regar Machinery and Mill Supplies
### Tampa, - - - - Florida

Boring mill, Bickford, hor. spd., g. b., tbl. type No. 232.
Boring mill, Binsee No. 78 hor. knee type, 3½" spindle.
Boring mill, Niles 36" 2 swivel heads.
Drill, Barnes upright 30" 3 spindle, one tapping att.
Drill, Sigourney 4 spd. also various other upright drills.
Drill, radial, 5' Harrington.
Drill press, Foote Burt 24", heavy duty.
Hammer, Lingle 50 lb. power, arranged m. d.
Keyseater, Morton 18".
Lathe, New Haven 24", 14' bed, q.c., taper attach.
Lathes, LeBlond 17" & 19" rapid prod. q. c. feeds, (3).
Lathes, National 18" production, (3)
Lathe, Gisholt, 24", hole in spindle 6".
Lathe, Bement Miles, l. c. g., 36" factory raising blocks to 42", centers 17', bed 22', c. d.
Lathe, Bullard 22", Loose change, turret head.
Lathe, Mueller 20" quick change, 4 way tool post.
Lathe, Jones and Lamson 2½x24".
Miller, Bement No. 63 rigid.
Pipe machine, Jarecki No. 15, 2½ to 10".
Pipe machine, Bignall Keeler 3".
Saw, cold, Hixley m. d. No. 27, 36", takes 30" blade.
Slotter, 16" Niles, circular table 36".

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### FOR SALE BY

### The Elyria Belting & Machinery Co.
### Elyria - - - - - - Ohio

BULLDOZERS.
No. 5 Niles-Bement-Pond.
No. 24 Williams & White.
No. 8 Williams & White.

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### Jones Machine Tool Company
### Front & Pike Sts., Cincinnati, Ohio

BORING MILLS AND MILLERS

36" Bullard New Era vert. boring mill.
52" Niles vertical rapid traverse, m. d.
No. 3 LeBlond univ. miller, cone drive.
No. 1½ Amer. pl. cone dr.

LATHES

16"x10' L&S. 3 step, dbg.
18"x10' Mueller, q. c. 3 step, d. b. g.
20"x10' Hamilton, q. c., 4 step, d. b. g.
24"x12' New Haven, q.c., cone drive.
No. 6 W. & S. turret.
2" cap. P. & W. turret.
20"x10' LeB. l.c. cone dr.
26"x12' Reed, l. c. c. d.
32"x16' Pitts. l.c. cone dr.
36"x14' Amer. l. c. c. d.
Dreses tur. 18" swing.
2½x24" J. & L. turret.

SHAPERS AND PLANERS

16" Cin. b. g. cone dr.
16" Kelley pl. crk. c. d.
24" Cin. b. g., cone dr.
30"x36"x8' Am. pl. 1 hd.

PRESSES AND SHEARS

No. 7 Nia. o. b i. b. g.
No. 5A Willard, o. b. i.
No. 76 Tol. s. a. b. g.
No. 1 L. & A. dble end
punch, & shear.
10" x 10 gauge Niagara square shear.
60"x14 ga. Bertsch sq. sh.

MISCELLANEOUS

18" Gleason gear gen.
36" & 48" B. & S. gear cutters.
Style "F" Bak. h.d. drills.
16"x12" Racine hk. saws.
6x8 Peerless hack saw.
15 & 20 k. w. spot weld.

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### Joseph Hyman & Sons,
### Tioga and Almond Sts., Philadelphia, Pa.

WORLD'S LARGEST STOCK
POWER PRESSES

No. 152D Cleveland, double crank, 76", crank 4".
No. 204A Toledo, double crank, gap.
No. 165 Consolidated, double crank, 36".
No. 4 United Eng. & Fdry., 4 crank, 156" between uprights, 8" dia. crank 7½" stroke, weight 118000 lbs.
No. 6B Niagara, dbl. crank 36", crank 3½".
No. S 126 Ferracute, dbl. crank 124", crank 7½"—9".
No. 106 Bliss gap, double crank, geared.
Nos. 92B, 91B & 91C Toledo, double crank.
No. 506 Bliss, geared, straight side, tie rod.
No. 594 Toledo, tie rod.
No. 56 A Toledo.
No. 55 Consolidated.
Nos. 74½. Bliss straight side.
No. 407-54 Bliss, toggle, double crank, t. r.
No. 14 B Bliss, tie rod, toggle.
No. 168½ Toledo, tie rod, toggle.
No. 38B Bliss toggle.
Nos. 1½, 3½ B, 3½C Bliss toggle presses.
Nos PA3 Ferracute horning.
75 ton EG51 & E51 Ferracute, knuckle joint.
600 ton American Can, knuckle joint.
150 ton Waterbury Farrel, coining.
150 ton EG52 Ferracute, knuckle joint.
No. 9C Badger State combination punch & shear.
No. 6 Hilles & Jones multiple punch.
Punches & shears, single & double end.
Squaring shears, various sizes.
These and hundreds of others of popular makes and sizes, are in stock at our warehouse here.

Rebuilt and Guaranteed.

## USED AND REBUILT MACHINERY

### FOR SALE BY

**Lloyd Machinery Inc.**
**150 Broadway New York, N. Y.**

Borer, vertical 42" Gisholt, table diam. 38", m.d.
Gear generator, 11" Gleason, auto. bevel, s.p.d.
Grinder, 84" Diamond, wheel diam. 30", m.d.
Planer, 60"x60"x10' Cincinnati, dbl. std., 3 hds., m.d.
Slotter, 24" Newton, table diam. 42", m.d.

**North Machine Tool Corp.**
**1790 Broadway 29-26 40th Road**
**New York, N.Y. Long Island City, N.Y.**
**CIrcle 5-5191 STillwell 4-1420**

Gear generators, 18" Gleason straight bevel.
Gear hobber, No. 00 Pfauter.
Grinders, 10"x24" Landis, direct m.d. plain, cyl.; No. 12 Brown & Sharpe, plain cyl.; No. 2 Bath universal.
Lathes, 18"x6' American arr. for m.d.; 20"x8' Monarch, g. c. g., 14"x8' Hendey yoke head.
Milling machines, 2B Hendey plain, arranged for m.d., electr. high speed head; No. 2A Becker vertical, m. d.; No. 4 Cincinnati plain.
Radial drill, 3' Bickford.
Sawing machine, No. 6 Cochrane-Bly, circular saw.
Turret lathes, No. 1 Warner & Swasey; No. 4 Bardons & Oliver.
PARTIAL LISTING ONLY—SEND US YOUR INQUIRIES.

### FOR SALE BY

**D. H. Prutton Machinery & Tool Co.**
**5295 W. 130th Street, Cleveland, Ohio**

Air compressor, 50 cu. ft., Allis Chalmers, m. d.
Bolt pointers (two), Economy 1"
Box printer, single color, Hall & Brown.
Broach, No. 2 Lapointe, 2 spindle.
Chucks, 35-6"x9" Heald magnetic.
Chuck, 1-12"x48" Heald magnetic.
Drill, 4 spindle Demco, b. b., p. f. single pulley drive.
Grinder, disc, No. 50 Gardner, m. d.
Grinder, disc, No. 50 Gardner, semi auto., with fixture for grinding edges of electric iron bottoms.
Grinder, disc, No. 14 Gardner.
Grinder, disc, No. 120 Gardner.
Grinder, disc, 22" Gardner, m. d.
Millers, (two), No. 12 B. & S.
Pipe threader, 4" Bignell Keeler.
Pipe threader, 2" Oster.
Planer, 36x36x10 Woodward & Powell 1 head on rail.
Plate, polisher, No. 27L Excelsior, m. d.
Press, No. 1 Bliss cam drawing, s. s.
Press, No. P2 Ferracute.
Press No. 65 Consolidated, s. s., flywheel type.
No. 0-36 Unishear, m. d., less motor.
Manville four slide, hand feed, cap. 4x1.
Tappers, vertical (two), 5 spindle Webster & Perks.
Tapper, No. 2 Garvin.
Tappers (two), 5/8" Rickert Schafer.
Thread roller, 3/8 Waterbury.

**West Penn Machinery Company**

Air compressors, 30 to 2500 cubic feet.
Blower, No. 4 Roots, capacity 2110 c. f. m.
Bolt cutters, 1¼" 2" & 3" Acme, b. d.
Boiler, 45 h p. Titusville 110 lb. pressure.
Boring mill, 24" Colburn, turret hd., b. d.
Bulldozers, Nos. 2, 4, 6, 9, 28, & 30.
Crane, 5 ton alliance, 35' span.
Crusher, jaw, No 4 Champion, b. d.
Die filer, No. 3 Thiel, m. d.
Drill sharpener, Ing.-Rand "Leyner", 1¼".
Drill, radial, 5' American, semi-univ., b.d.
Drills, upright 10" to 36".
Drill, No. 216 Baker, No. 5 M. T., b.d.
Engine, gas, 20 horse power Bessemer.
Gear cutters, 11", 18" & 24" Gleason.
Gear tester, bevel 18" Gleason.
Generator, plating 6-v. 3500 amps.
Grinder, disc, 52" horizontal. Gardner.
Grinder, "Kwick-Way" all purpose, m.d.
Grinder, internal, No. 60 Heald, b.d.
Grinder, knife 10" Bridgeport, m.d.
Grinder, roll, Farrel 30"x16"
Grinder, surface vertical, 30" table, 16" wheel, m.d.
Grinder, surface, type B Diamond 24"x18".
Grinder, No. 2 Walker tool & cutter, b.d.
Grinder, No. 2 tool & cutter, Greenfield, b.d.
Grinders, D. E. 2—3 & 5 h. p., 220/3/60.
Hammers, 50 lb., 75 lb., 100 lb., 200 lb. Upright.
Hammers, Nos. 2-B, 3-B, 4B, 6-B, Nazel.
Hammers, steam, forging & drop.
Keyseater, No. 1 Davis, 1"x8", m.d.
Keyseater, No. 1 Baker 1½"x12", b.d.
Keyseater, No. 2 Baker, 2"x20", b. d.
Lathes, speed, 11" and 13" Blount, m. d.
Lathe, brass 18x6", friction head, power feed, b. d.
Lathe, 16"x12' Rahn-Larmon, geared head, t. s.
Lathe, 18"x12' Hendey, geared head, t. a.
Lathe, 20"x16' Springfield, t. a., m.d
Lathe, 26"x18" Pittburgh, d.b.g., t.a., b.d.
Lathe, Lo-Swing, 6"x60", s. p. d.
Lathe, roll, 42"x20' United, m.d.
Lathes, turret, Nos. 1, 2 and 3 W. & S., b. d.
Lathe, turret No. 2½ Garvin, bar feed, b. d.

**1210 House Building, Pittsburgh, Pa.**

Lathe, turret, 2 spindle J&L., 2-7/8", m.d.
Lathe, turret No. 3-D Gisholt Simplimatic.
Locomotive, gas, 6 ton Milwaukee, 36".
Miller, No. 2 Cincinnati universal, b. d.
Miller, shaper, duplex, No. 14 Cochrane-Bly, m.d.
Miller, Lincoln, No. 12 P. & W. 32"x7½", b. d.
Miller, Lincoln, No. 5 Hendey, b.d.
Miller, vertical, Burke, table, 16x6, b. d.
Miller, hand, No. 6 Whitney, vert. attach.
Mixers, Sprout-Waldron, batch & liquid.
Nibbler, No. 1 Campbell 3/16", 6" gap, m. d.
Nibbler, L.&A., 1", 36" throat, m.d.
Pipe mchs., 2", 4" 8" 9" 12" & 16" Landis-Oster-Williams.
Planer, 24"x24"x6' Gray, 1 head, b.d.
Planer, 30x30x10 Gray, 1 head, m.d.
Planer, 30"x36"x12" Cincinnati, 2 hds., b.d.
Press, forging, 150 ton United, steam hyd.
Press, screw, No. 87 Niagara, hand power.
Press, strip feed, No. 31-C McDonald, b.d.
Press, No 50½ Toledo, 12" stroke.
Presses, Stiles, type, 1½ and 3½" m. d.
Pumps, centrifugal 6", 4", 1", motor drive.
Punch, EF Cleveland, 36" throat, 1¼" thru 1".
Riveters, air, hammer, spinning.
Saws, friction, Nos. 2, 3 & 4 Ryerson motor drive.
Saw, metal band, Laidlaw, m.d.
Shapers, 16", 20", 24" & 36" Gould & Eberhardt.
Shears, alligator, 1½", 2", 3", 4" & 6".
Shear, Angle 6x6x1 Long & Allstatter, m. d.
Shear, Stoll 60"x3/16", motor drive.
Shear, plate 60"x1½", 30" gap, m. d.
Shear, plate 132"x1", 36" gap, m. d.
Shear, plate 96"x¾" 36" gap, m. d.
Shear, guill, No. 2 H. & J., 2" rd. b. d.
Shear, guill., 4'x4" Newbold, b.d.
Shear, up-cut, 22" Aetna, m. d.
Slotter, 54" vertical, Morton, m.d.
Straightener, 60" McKay, 17 rolls 4½", m. d.
Straightener, 84"x1" Hertch, m.d.
Testing machine, 400,000 lb. Riehle, b. d.
Threader 4" Geometric, s. p. d.
Tumbling barrel, 34"x45", belt drive.
Upsetters, 1" to 6".

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**Nesbitt Machinery Co.**
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Planer, 22' plate, motor drive.
Guillotine shear, 6"x6" cap. Hilles & Jones.

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**D. E. Dony Machinery Co.**
**47 Laurelton Rd., - Rochester, N. Y.**

Broaching machine, LaPointe hydr. 5-ton, 36" stroke, double ram, surface, m.d.
Drill, 4-spindle, Demco 12" overhang, m.d.
Gas cutting machine, No. 7 Oxygraph.
Press, No. 73½ Bliss, s. s. geared.

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**Davis Machinery Company**
**1-3-5 St. Clair St. Toledo, Ohio**

Brake, 4'x3/16" Dreis & Krump, power leaf type.
Brake, 8'x3/16" Dreis & Krump, power leaf type.
Drill, 38" Rockford, b. g. & p. f., motor dr.
Drill, 24" Barnes Camel Back, T. & L., pulley dr.
Gear cutter, 48"x12" Gould & Eberhardt, s.p.d.
Gear cutter, No. 3-36 Brown & Sharpe, s.p.d.
Grinder, 8"x32" Landis plain cylindrical.
Grinder, 6"x18" Cincinnati pl., motor dr.
Grinder, 8"x8"x24" Thompson hydraulic, m.d.
Grinder, 12"x12"x48" Thompson hydraulic, m.d.
Keyseater, No. 2 Mitts & Merrill, b.d.
Lathe, 32"x28' Gleason, st. c. gear.
Lathe, 19"x8' LeBlond, hy. duty, q.c.g., c.p.
Lathe, 14"x6' LeBlond, q. c. g., taper attach.
Lathe, 42"x16' Bradford, triple geared.
Mill, No. 4 Cincinnati high power, plain.
Mill, No. 5-C Becker-Brainard plain.
Mill, No. 14½ Becker-Brainard univ., b.d.
Mill, No. 2-V Brown & Sharpe pl., arr. for m. dr.
Nibbler, No. 103 Gray, cap. 1/8" throat, 30".
Press, No. 90-D Toledo, dbl. crank, m.d.
Shaper, 16" Newark, b.g. crank, s.p.d.
Shear, 10'x1/4" Bertsch sq., motor drive.

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**Fuchs Machinery & Supply Co.**
**1102-4 Farnam St., Omaha, Nebraska**

Automatic, No. 52 National Acme, 4 spindle.
Automatic, No. 58 National Acme, 4 spindle.
Automatic, Model G Gridley.
Drill, 2 spdl. Henry Wright, 15" overhang, prod. table.
Drill, 4 spdl. 20" b. g., p. f., V belt motor drives.
Grinder, Micro internal cylinder, m. d.
Grinder, Norton universal tool.
Grinder, pedestal, 7½ h.p., U.S.
Hammers, 25, 50 & 100 lb. Little Giant.
Lathe, 11"x5' South Bend, q. c.
Lathe, 16"x8' Sidney, q. c., d. b. g.
Lathe, 18"x8' Chard, q. c., d. b. g.
Lathe, 20"x10' Monarch, q. c., d. b. g.
Miller, No. 2 Kempsmith universal.
Miller, No. 1 U. S. hand.
Miller, No. 1 Burke hand.
Miller, No. 2 Garvin plain.
Presses, o. b. i. Nos. 1, 3 & 5.
Press, No. 676-A Stoll double crank.
Press, No. 6-E Rockford double crank.
Press, No. 54 DAG Ferracute, double acting cam.
Shear, No. 2 Ryerson serpentine.
Shear, 54" Pexto power.
Shear, ½" Kling plate splitting.
Shaper, 29" Smith & Mills, single pulley drive.
Tapper, No. 2BC Garvin vertical.

### FOR SALE BY

**Failor-Strafer Machinery Co.**
**132 Liberty St., - - New York, N. Y.**

Drill, Sipp 8" overhang, b.b.
Drill, 1 Avey 3/8 cap. b. b., (2).
Grinder, Oliver 4 wheel wood tool grinder.
Grinder, 10"x36" plain cylindrical.
Grinder, No. 3 Brown & Sharpe cutter & reamer.
Keyseater No. 1 Davis.
Lathe, 32"x12' Putnam, 3 step cone, d.b.g., hvy. duty.
Lathe, 30"x14' Davis, cone drive.
Lathe, 26"x10' Bridgeford, 3 step cone, taper attach.
Lathe, 26"x10' Wilcott, 3 step cone, d. b. g., hvy. duty.
Lathe, 26"—48"x18' McCabe, two spindle.
Lathe, 24"x14' American 3 step cone, d b g., hvy. duty.
Lathe, 16"x5' Sidney, 3 step cone, d.b.g.
Lathe, turret, No. 2A Warner & S., bar equipment.
Lathe, turret 1" cap. Biggs hand screw mach., p. fd.
Miller, No. 2 Shields, high power, single pulley.
Miller, 48" Newton continuous, m.d.
Miller, No. 1 Van Norman, hand feeds.
Press, No. 74½ Bliss, geared trimming.
Press, No. 1 Bliss toggle.
Press, punch, No. 2½ V & O inclinable.

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**Russell Machine Co.**
**438 Oliver Bldg. Pittsburgh, Pa.**

Bulldozer, No. 2 Wms. & White, m.d.
Gear cutter, spur, 84" Newark, m.d.
Gear planer, bevel, 84" Gleason m.d.
Gear planer, Bevel, 36" Gleason, b. d.
Hammer, No. 2 "B" Nazel Power Hammer, m. d.
Hammer, 300 lb. Bradley, upright strap.
Hammer, 1500 lb. Bliss board drop.
Lathe, 42"x17'6" Pond, p.c.g., triple grd., b.d.
Lathe, flat turret, 2½"x24" J&L, grd. hd., s.p.d.
Miller, univ. No 2-A B&S tbl. 39x8½", s.p.d.
Press, hydraulic, 100 ton Watson Stillman, m.d.
Punch, multiple, style "E" L&A 1½" th. cap. 340 tons.
Punch, beam, Cleveland, cap. 24"
Punch & Shear, Cleveland F F 1½" thru 1", b.d.
Shear, Alligator, No. 61 Carlin high knife, 2½" sq.
Slotter, 18" Bem. Miles, table 36" dia., b.d.
Sprue cutter, No. 7 Z&H, cap. 50 tons.
Upsetting machines, 2½, 3½, 4 and 5" Ajax iron bed.

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**E. L. Klauber Machinery Co.**
**3221 Olive St. - - St. Louis, Mo.**

Carburising furnace, Rotary, Rockwell.
Centering machines, revolving head.
Gear hobber, No. 000 S&S, 4" diam. capacity
Lathes, bench precision, ½" & ¾" collet.
Lathes, 14"x6', 14"x8', motor drive.
Radial, 2½' Carlton, belted.
Saws, band, metal cutting, Racine & Klemm.
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Turret lathe, No. 3 gd. friction head, with 1½" bar fd. & chuck, power turret feed.

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**The F E. Worch Machinery Co.**
**P.O. Box 202, 2049 Westover Rd.,**
**Columbus, Ohio**

Drill, No. 1 Avey, bench.
Drill, 4 spl. Francis Reed, ¾".
Grinder, plain, Ott 5"x18".
Grinder, tool, No. 25W Sellers.
Lathe, 18"x8' Hamilton, q.c.g., cone.
Lathe, 20"x14' American, q.c g., cone.
Planer, 32"x32"x12' Gray, 1 head.
Shaper, 16" Queen City, cone.
Shaper, 20" G. & E., cone.

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25 miles of Detroit, 6000 square feet, 40 employees, mfg. auto parts and tools. Lathes, screw machines, mills, shaper & drills all motor driven (40 machines) Price: building and equipment $35,000.00.

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Prentice Brothers foundry drill. Four speed compound gears, 3" bore, 22" center, 28" spindle travel.

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Automatic, ⅜" Cleveland, single spindle.
Cut-off, abrasive, Tannewitz type M-2.
Drill, 40" New Haven No. 5, sliding head.
Gear cutters, Whiton No. 14 automatic, (2).
Grinder, cylinder, Heald No. 65.
Grinder, drill, Sellers 2" capacity.
Lathes, mfg., 12" x6' Pratt & Whitney, (2).
Lathe, 24"x8' Lodge & Shipley, q.c.g.
Saw, Peerless 6"x6" high speed.
Tapper, Anderson No. 40 Dial Feed Auto.
Welder, Expert Portable spot, 50 KVA.

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**The Reeve-Fritts Company**
**28 N. Clinton St., Chicago**

Broach, No. 3 horiz., belt drive.
Drill, 14" Leland Gifford, h. s., t. a.
Grinder, 14" cup wheel & disc.
Hammer, 100 lb. Little Giant, b.d.
Lathe, 20"x8' Flather, p.c.g.
Lathe, 17"x8' Sidney, q c g.
Pipe mach., 2 spdl. Murchey, 2" cap.
Saw, 6"x6" Marvel, h s.
Saw, cut off, Lees-Simplex 5½" cap.
Spot welder, Aero, 15 K.V.A.

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Automatic screw, turret lathes, Bliss presses, shaper, milling and other machinery. Write for complete descriptive list of 70 used machines for sale.

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Planer, 22"x22"x8' Wheeler, s. h.
Saw, hack, No. 2 Marvel, power, b.d.

## FOR SALE BY

**S. M. Regar Machinery and Mill Supplies**
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Cyl. grinder, Simplicity, type R, Leland, sgl. ph. mr.
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Grinder, Brown & Sharpe No. 11.
Grinder, Wilmarth & Morman No. 1.
Grinder, Cincinnati No. 14.
Grinder, Bridgeport surface, 26" wheel.
Grinder, Springfield, double end, heavy duty fdry.

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All sizes, makes, types.

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**No. 3 Foster Turret Lathe, GFH**
**No. 4 B. & O. Turret Lathe, GFH**
**No. 3 B. & S. Vertical Mill, M. D.**
**16" G. & E. all-geared Shaper, M. D.**
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**No. 2 Baker Keyseater 2" cap.**

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**Grinder,** Landis 16x66, crankshaft, belt and motor drive, serial 21513. **$3000.**
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**Lathe,** Monarch, 20x8, QC, 14" chuck ..... **$2000**
**Lathe,** Lodge & Shipley, 22x14, patent head, QC, DC motor drive..... **$1500.**
**Lathe,** Draper 20x12, plain change, taper attachment ..... **$350.**
**Horz. Mill,** 3-½" bar Detrick & Harvey, floor type, rotary table, direct current motor ..... **$8000.**
**Planer,** Lodge & Davis, 24x6, 1 head, belt drive ..... **$1000.**
**Planer,** Whitcomb 18x5, 1 head, arranged motor drive ..... **$450.**
**Miller,** No. 2 Cincinnati Geared Head Full Universal with slotting attachment. **$8450.**
**Honing Machine,** Hutto, 8' radial arm, motor drive ..... **$2000.**
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**Planer,** American Foundry & Machine Co., 36"x36"x12' openside 10 H.P. mtr. $5850.
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No. 3 LaSalle, hand surf.

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(2) 14x6' Lodge & Shipley, Q.C.G. collets
15x6' Rockford, Q.C.G.
17x9 Sidney, Q.C.G.
20x10 Walcott, Q.C.G.
22x11 Cisco Q.C.G. M.D.

### MILLING MACHINES

No. 1 Kemps. Univ. compl.
No. 0 Steptoe P.F. complete
No. 1½B, K. & T. dble. ov.
No. 20 Ohio, complete
No. 25 Ohio, univ., compl.

### SCREW MACHINES

No. 0 Foster, bar feed, col.
No. 1 Foster, bar feed, col.
No. 1 B. & S. semi-automatic, collets
24" Steinle, Univ., 4½" hole
1⅞" Cleveland, auto. col.

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Brake 5' D&K 14 ga., cap.
No. 2 Klem Bandsaw
6"Victor Pipe Mach., Dies
Shapers: 7" to 24"
No. 2 LaPointe Broach
No. 2 Hilles & Jones Punch
No. 4A Hi. Speed Hammer

**PLANER, 36" x 36" x 10' arr. M.D., BARGAIN IF sold before moving**

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AUTOMATIC, No. 52 Nat. Acme 4 spdle. cap. ¾"
AUTOMATIC, No. 53 Nat. Acme 4 spdle. cap. 1"
DRILL, 20 spindle Natco, No. 2 M.T. head 14"x27"
DRILL, 10 spindle Natco, No. 1 M.T. head 13" diameter
DRILL, 3' Prentice Radial, mtr. dr.
GRINDER, 20"x144" Landis Plain, mtr. dr.
GRINDER, 16" Heald No. 25, rotary surface
GRINDER, 12"x36" Pratt & Whitney, belt dr.
GRINDER, 12"x36" Modern Plain Cylindrical, self ctd. drive
HAMMER, 5N Nazel, mtr. dr. cap. 6"x6"
KEYSEATER, No. 2 Baker, belt, cap. 2"x20"
LATHE, 48"x20' Johnson, belt drive
LATHE, 42"-60"x24' New Haven, belt dr.
LATHE, 30"x20' LeBlond, motorized, q.c.
LATHE, 18"x16' Flather, belt drive, q.c.
MILLER, No. 4 Cinc., belt dr., tbl. 16"x63"
PIPE MACHINE, ½" to 2" Landis, b.d.
TURRET, 2¼"x24" Jones & Lamson, grd.hd.
TURRET, 3"x36' Jones & Lamson, grd. hd.

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| 18"—4 Jaw | Independent Chucks | $ 98.00 |
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## REBUILT

LUCAS 2¾" bar HORIZ. BORING MILL, table 20x48", vert. adj. spindle 23", circ. table star feed attachm. num. access.

RIGIDMIL-SUNDSTRAND No. 30 hydraulic feed, table 72x14", high-speed spindle with 2000 r.p.m. motor in base.

AUTOMATIC-BRIDGEPORT 24" open-side shaper—planer, s.p.d.

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12x72 Cincinnati Universal Grinder, Factory Motor Drive, with AC, 3 phase, 60 cycle, 220 volt motor.
18"x12' Lodge & Shipley Selective Geared Head Lathe, Factory Motor Drive.
U. S. Pipe Bending Machine, Gear Driven by 10 H. P. Motor.
No. 4 Brown & Sharpe Universal Grinder, complete.
1000 Ton Watson Stillman Hydraulic Press, with 8" hardened centers for Hobbing, Motor Driven Pump.
6x18 Landis Cylindrical Grinder, self-contained, motor drive.

**Wiener Machinery Co.**
**237 Centre St., New York City**

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## FOR SALE — GOOD TOOLS

**Boring Mill,** 42" Bullard, New Era, Motor Drive ..... **$8,000.**
**Auto.** Gridley, 7/8" Model F, 4 Spindle, M.D. ..... **$2000.**
**Drill,** Automatic, Sensitive, with motor, hi. spd., cap., 3/16" ..... **$450.**
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**Drill,** Foote Burt No. 24, 24" Heavy Duty ..... **$1000.**
**Drill,** 2 spd., Colburn, No. 2 Mfg., Motor Driven ..... **$2150.**
**Radial Drill,** 2' Fosdick, M.D. 220/60/3 ..... **$750.**
**Radial Drill,** No. 7, 4' Prentice M. D. 220/60/3 ..... **$1500.**
**Gear Cutter,** No. 6 B. & S., Cap. 60"x11" ..... **$3500.**
**Grinder,** No. 2 Landis Univ., 12"x30", Belt Drive ..... **$2500.**
**Grinder,** Leland, Cutter & Tool, Motor Driven ..... **$500.**
**Grinder,** Norton, 3"x18", Plain, Motor Driven ..... **$1500.**
**Grinder,** 12"x24" Plain B.D. No Name. **$250.**
**Grinder,** 16"x96" Safety, M.D. 26" Wheel ..... **$4500.**
**Lathe,** 14x6 Carrol Jamieson, Q. C... **$600.**
**Lathe,** Monarch, 14"x10' QC with 4 jaw chuck ..... **$1150.**
**Planer,** 36"x36"x12' Woodward-Powel. 2 Heads, with Motor ..... **$2500.**
**Press,** No. 126 Max Ams O.B.I. 1" str. **$325.**
**Turret Lathe,** 2x24 J & L, Geared Head and Feeds ..... **$1150.**
**Turret Lathe,** 2-½"x26" P & W for chuck or bar work ..... **$2150.**
**Threader,** Namco, 2-sp., ⅝" Cap..... **$200.**
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**Automatics**
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Gridley Automatic Screw Machine, 4¼", single spindle
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1¼" 4-spindle Radial (4)

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**DRILLS**
**No. 310 Baker Drills (8)**

**Drills**
2, 3, 4 spdl. H.&W., Allen Lel-Giff., Avey (33)
3' & 5' Western Radial
3½' Morris Radial, m.d. & m.
Pratt & Whitney dble. end., m.d. & m.
Fox Mult. Spdle. with tapp. att. (4)
No. 121 2-spdle. Baker Gang Type, mult. sp. heads, rot. tables, m.d. & m. (3)
21" Cinci., Prod., box column, q.m.d. & m. (3)
21" Cincinnati Bickford Sliding Head, with table

**Gear Equipment**
No. 36 ST G. & E. Auto., 4 spdl. Gr. Rgh.,m.d.
No. D-2 Colburn Heavy Duty
No. 5A Lees Bradner Gear Hobbers, (3)
W & W Gear Cutter, cap. incl. gears up to 96" dia. x 52" face

**Grinders**
No. 14 Brown & Sharpe Plain Cyl.
Nos. 15A & 20 Bryant Chucking, Int. and Face
20"Badger Face, hyd. feeds, table travel 44"
Nos. 55 & 60 Heald Internal
No. 6 Besly Double Disc
No. 132 Arter Drum Type, motor drive (2)
Norton Model B Tur. type, motor drive (2)
No. 1 Osterholm, face
No. 126 Gardner dbl. spdl. op. m.d. type, h.f.
12" and 16"x36" Cincinnati Pl. Cylinder, (2)

**HEAVY DUTY LATHES**
**24"x16' Prentice, Geared Head, taper attachment, single pulley drive**
**36"x16' Hamilton, geared motor drive & motor, double back geared**
**28"x10' Chard, quick change, taper attachment, double back geared**
**36"x20" Lodge Davis, t. c., back geared**
**60"x10' New Haven, back geared. center to center 60"**
**26"x14' Walcott Bk. Grd., quick change gear, taper attachment**

**Lathes**
20"x8' Gisholt Turret, (4)
18' Cinc. Acme Turret, back geared (3)
No. 6 Brown & Sharpe Turret,
16"x8' Hamilton, m.d. & m., t.a.
16"x8' Bradford Geared Head
2¼" & 3"x36" Jones & Lamson Turret
No. 3 Foster Turret
14"x6' American with t.a.
Nos. 5A & 6A Potter & Johnson Auto., m.d.
34"x11' Wickes Semi-Auto. Crankshaft (2)
Lo-Swing, 60" bet. cent. 12" swing
16"x6' Hendey, quick change gear, motor dr.
16"x12' Lodge & Shipley, q.c.g, t.a.

**No. 5 Cincinnati Plain High Power Mill, V.B. motor drive with motor**

**Mills**
Nos. 1, 2 & 3 Craftsman Prod., Rotary
No. 1 Rockford Universal
Niles Vertical Boring, 28" table
No. 3 Brown & Sharpe
4-spindle Newton Rotary Drum Type Miller
No. 2 Cincinnati Plain
No. 3 Cincinnati Plain (2)
No. 7 Becker
No. 3 Becker Vertical
54" Ingersoll Rotary, 3 head, m.d.
66" Newton Rotary, motor drive

**Planers**
36"x60"x14' American, wid. to 60", rl. insd. hd.
40"x42"x12' Bedford Openside, m.d. & m.
36"x36"x8' Pond Planer, one rail, one side hd.
30"x30"x6' Pond Planer, 2 rail heads

**Presses**
No. 24B Bliss Gap Frame D.C., B.G., m.d. & m.
No. 74½ Bliss motor drive & motor
251½ Cleveland Dble. Cr., gap frame, m.d.&m.
No. 55½ Toledo Tie Rod, with dble. roll fds.
No. 62 Toledo (2)
No. 62 Michigan, S.S.
Nos. P2-P4 Ferracute, motor drive
Canco, No. 5, 8" stroke, S.S., B.G., m.d. & m.
DC-53 Ferr. S.S., S.C., B.G., G.M.D.
No. 6C Rockford dble. cr., straight side

**LARGE DOUBLE CRANK PRESSES**
**No. 407 Bliss Double Crank Toggle Press, motor drive & motor**
**No. 410 Bliss Double Crank Toggle Press, motor drive & motor**
**No. 10C Bliss Dble. Crank, Tie Rod Frame**

**Shears**
Niagara, Nos. 10, and 236

**Upsetters**
1¼" Acme, steel bed, m.d.

**X-Ray machine, 250,000 volt General Electric, lead lined, will X-Ray boiler plate up to 2" thick, overall dimensions, length 102", width 84", height 88"**

**Welders**
Federal, 150 KW, motor drive
35 KVA Multi Hydromatic, mtr. dr. & m.

**AND A COMPLETE STOCK OF FINE UP-TO-DATE EQUIPMENT**

# HARVEY GOLDMAN AND CO.

**10571 GRATIOT AVE. DETROIT, MICH.**

# CONSIDER GOOD USED EQUIPMENT FIRST!

## IMMEDIATE AVAILABILITY AND DELIVERY ARE IMPORTANT FACTORS

**AIR COMPRESSOR**
1145 cu. ft. 20" x 12" x 14" Chicago Pneumatic Type O-CBR M. D. with 205 H. P. G. E. Motor. 100 lb. Pressure

**BORING MILL—HORIZ.**
5" Bar P & H Boring, Drilling & Milling Machine, Arr. M.D.

**BUILDINGS**
75'x247' Steel Building

**BULLDOZER**
No. 7 Ajax, Motor Drive. Face of Crosshead 12"x76" Stroke 16"
No. 8 W & W Motor Drive. Face of Crosshead 20½" x 108", Stroke 24"

**CRANES—OVERHEAD ELECTRIC TRAVELING**
3 ton P & H 16'9" Span
220 Volt D. C.
10 ton Alliance 32'3¼" Span
220/3/60 A. C.
10 ton Toledo 32'3¼" Span
220/3/60 A. C.
10 ton Morgan 46'10" Span
220 Volt D. C.
10 ton Morgan 57'7½" Span
220 Volt D. C.
15 ton Niles 48'11-½" Span
220/3/60 A. C.
Including Phase Changer
15 ton Niles 50' Span
230 Volt D. C.
50 ton Niles 30'6" Span
220/3/60 A. C.
5 ton Auxiliary

**CRANE BRIDGES**
10 ton P & H 26' Span
10 ton P & H 39'11" Span
15 ton Alliance 42'6" Span
25 ton P & H Type 60' Span
All complete with End Trucks

**DRILL—RADIAL**
4' Plain Radial Drill. 12" dia. Column

**FORGING MACHINES**
3" to 6" Ajax, Nat Acme, St. Fr.

**HAMMERS—BOARD DROP—STEAM DROP-STEAM FORG.**
1000 lb. to 8000 lb. Chamb. B. & Sp. Erie. N-B-P Morgan

**LATHE**
42" x 28' Wickes Heavy Duty Screw Cutting Engine Lathe. M. D.

**LEVELLERS—ROLLER**
50" McKay Motor Driven 17 Rolls 4½" Dia.
75" Torrington. 19 Rolls, 2" dia., Arr. for M. D.

**MILLING MACHINE—PLANER TYPE**
42"x42"x16' Ingersoll Single Face Adj. Rail Planer Type. B. D.

**PLANER—PLATE EDGE**
20' Plate Edge Planer, Back Geared. Nine Pneumatic Holddowns. Capacity 1¼" Plate

**PRESS—DOUBLE ACTING TOGGLE**
No. 162 Toledo Punch Press, Bed Area 21" x 21". Stroke of Blankholder 5". stroke of Plunger 8¼"
No. 408-A Bliss Double Crank, Bed Area 72"x50". Stroke 15"

**8000 lb. MORGAN STEAM FORGING HAMMER**
Double Leg

**No. 96F TOLEDO DOUBLE CRANK PRESS**
124" Between Uprights
12" Stroke
Tie Rod Construction
Complete with 40 H.P. Motor

**No. 32 Williams & White Multiple Punch & Shear**
Motor Driven
Including 20 HP A.C. Motor
Punch Cap. 350 tons Pressure
Shear Cap. 10' of ¼" Plate
101" Between Housing
8" Diameter Shaft
Shearing Attachments Available, Including Blades for Converting this machine into a Gate Shear

**No. 6 Cleveland Multiple Punch & Shear**
Motor Driven
11'4" Between Housing
12" Shaft Diametar
Punch Capacity 750 ton Pressure
Shear Capacity 11' of ¼" Plate
Punch Holder Dies for Multiple Punching and Attachments for Converting to shear included

**15 Ton Niles OET Crane**
58'7" Span
Three 230 Volt D.C. Motors
Enclosed Gearing
First Class Condition

**2,000,000 lb. Tinius Olsen Horizontal Compression Testing Machine**
Complete with Pump and Motor

**232,000 lb. Tinius Olsen Torsion Testing Machine**
Motor Driven
Capacity for Testing Rounds up to 2½" dia.

**IZOD Impact Testing Machine**

**50,000 lb. Riehle Bros. Screw Power Testing Machine**
Motor Driven

**PRESSES—SINGLE ACTING—STRAIGHT SIDE**
No. 166½ Consolidated 6" stroke 47" between Uprights
No. 10-C Bliss 6" Stroke 84" between Uprights

**ROLLING MILLS**
9"x18" Farrel Rod Rolling Mill, 3 High
10"x16" United E&F Co. Single Stand Two High
12"x15" Mackintosh Single Stand Two High
12"x20" Philadelphia Single Stand Two High, Complete with Coiler & all operating equipment.
16"x10" Waterbury Four Stand 2 High
16"x20" Waterbury Farrel Single Stand Two High
16½x2'9" Cold Strip Mill 2 stand 2 high
18"x36" Farrel Birmingham Single Stand 2 High
13" Deering Bar Mill Three High with 14" Three High Pinion Stand
24" Mackintosh Bar Mill 2 stand 3 high

**ROLLS—TAPER FORGING**
No. 1 Ajax Taper Forging Roll, B. D.
No. 3 Ajax Taper Forging Roll, B. D.

**SAW**
No. 3 Ryerson High Speed Friction Saw, M.D. Complete with combination hand and electric hydraulic feed, and 5 extra 52" Saw Blades

**SHEARS—BAR**
Garrison Guillotine Type Bar Shear, Arr. Motor Drive. Capacity 15"x2½"
No. 6 Buffalo Armor Plate Bar Shear. Arr. for B.D. Cap. 1-5/16" square 1¾" round

**SHEAR—ROTARY**
Newbold Rotary Shear, Arr. for M.D. Cap. ¾" mild steel plates

**STRAIGHTENERS**
Shuster Shape Straightening Machine, M.D. Cap. ¼" Hexagons 1/16" 3/16" ½" & 1" ¼" Shuster Straightener & Cut Off Machines, Belt and Motor Drive
No. O Medart Straightener, Arr. for M.D. Cap. ¾"x1¼" dia. inclusive, any length.
No. 3 Sutton Two Way Flat & Shape Straightener Arr. for M.D. Cap. 1-1/16"x11/16" or 1¼"x13/16" Flats, etc.

**Entire Surplus Manufacturing Equipment Inventories Purchased.**
**Appraisals. Liquidations. Consulting Engineering Service.**

# RITTERBUSH & COMPANY, INC.

**NEW YORK** **30 CHURCH ST.** **PH. CORTLAND 7-3437-3438**
**CABLE ADDRESS: RITTERBUSH, NEW YORK**

# IN STOCK FOR IMMEDIATE DELIVERY

**AUTOMATICS**
2-¾" cap. Acme 4 spdl. M.D.
1-2¼" cap. Acme 4 spdl. M.D.
2-⅞ Model A. Cleveland

**BORING MILLS—Vertical**
60" Niles 1 Pl. Swivel head—1 Milling Hd.
44" N.B. & P. motor drive
42" Bullard Mt. Dr.—1 Pl. hd.—1 turret head, rapid trav.
48" N.B. & P. Car Wheel borer, M. D.

**BORING MILLS—Horizontal**
5½" bar Duplex Southwark-Table type Mt. dr.
3½" bar D&H Foor type m-d.

**DRILLS**
4' Bickford Un.
4' Bickford Pl. mt. dr.
2 & 4 Henry & Wright Sensi.
4 spd. Fox
4 spd. Demco, pwr. fd. to spd.
1-24" Barnes Camel Back, Motor Drive
4-22" Barnes, pwr. fd. Mt. Dr.
1-36" Cinn. Bickf. slid. hd.
36" Aurora
36" Superior
1-4 spd. Barnes No. 4 Morse taper 82"x17" table, power fd. to spd. Motor Drive
1-16 Spd. Bausch Mt. dr. Oil grooved base 36x54 Rec. hd.
2 Spd. Webster & Perks, horz. Tapper
1-2X Garvin Automatic Tapper

**GEAR MACHINERY**
Whiton Auto. Gear Cutter, spur & bevel

**GRINDERS**
1-No. 1 Wilmarth & Morman Un T & C Gr.
1-No. 2 B & S Surface
2-Wilmarth & Morman Un T & C Gr.
10x48 No. 14 B & S Pl.
8x36 Fitchburg Pl.
2-10x24 Landis Pl.
2—No. 3 B & S Tool & Cutter, all attachments
12x36 Landis Un.
2-No. 1 Frazer Un.
1-No. 2 Oakley Un. tool & cut.
1-No. 3 Diamond Surf. Mt. Dr.

**LATHES**
3—12x5 Clev. G. Hd. Tap. At.
14x8 American C.P.D.
10x8 Flather M.D.
17x8 South Bend C.P.D.
18x10 South Bend C.P.D.
14x6 LeBlond 3 stepconeD.B.G.
2—18x8 Mueller, 3 stepcone D. B. G.
2—18x8 Morris 3 stepcone D. B. G.
20x8 LeBlond Turret Full Un. 3 step cone
24x12 Shoemaker & Boye DBG.
30x18 Monarch 3 stepcone DBG. Bowl Type hd. T. Att.
32x20 New Haven
48x18 American Triple geared
50x24 Fifield Triple geared
4x60 Fitchburg Low swing—new cond.
42x26 Bement Triple geared

**PLANERS**
56x56x11 Gray Rev. Mt. dr. 2 rail hd., 2 side heads
30x30x8' New Haven
26x26x7' Gould and Eberhardt
22x22x4' Hendey

**TURRET LATHES**
No. 4 Warner & Swasey G.F. Hd. bar fd., cross slide col.
No. 0 Bardons & Oliver 1"cap.
19x8 LeBlond Full Un.
No. 1 Bardons & Oliver
4" Conradson Un.
28" Gisholt Un. Taper Attach.

**MILLERS**
No. 4 H LeBlond Pl. with Ver. Head
1—No. 2 Kempsmith Un.
Hendey & Becker Lincoln Type
1—A B Becker Vert. Rotary Table New Cond.
2-No. 1 Fox Pl.
1—25 Becker Pl.
No. 3 Lees Bradner Thrd. Mill.
Holden-Morgan Thread
1—No. 3 Hendey-Oscillating

**PRESSES**
Bliss In. Geared Mt. Drive
2—No. 2 Standard O.B.I.
2—No. 18 Bliss O. B. I.
2—19½ Bliss O. B. I.
4¾ Michigan O.B.I.
Ferracute Bench O. B. I.
92 C Toledo Geared Mt. Dr. Steel Tie Rod
Toledo Arch, geared Mt. Dr.
No. 37 Niagara Back Flywheel Mt. Dr.
No. 6 Stiles & Parker Geared
No. C G 14 Ferracute O. B. I. Automatic Roll feed

**SHAPERS**
26" Kelly Mt. Dr.
24" Milwaukee C. P. D.

**WELDERS**
1—50 KW Thompson Spot Welder Automatic
35 K.W. Thompson Spot Welder Automatic

**PIPE MACHINES**
10" Cox
203 A Oster 6" cap.
10" Bignall and Keeler
2" Bignall & Keeler Mt. Dr.
6" Stover Mt. Dr.
Acme & Landis Bolt Thrd. Mh.

**SAWS**
3" Burr Cold
No. 12 Higley Cold
No. 3 Klemm Metal Band Saw

**MISCELLANEOUS**
No. 1 Buffalo Iron Wkr. Mt. D.
6' 10 ga. D & K Leaf Type Brk.
3 Grant Rivet Spinners
3 A High Speed Hammer
Morton Keyseater 4" Cap.
Nos. 0, 2 & 3 LaP. Broaches
2—Productomatics
1—No. 1 Grey Nibbler Turret Type
8-Double Leg Steam Forging Hammers 3000 lb. to 1000 lb.
6" Pilton Slotter

# NESBITT MACHINERY CO.
## 110 E. PRATT STREET, BALTIMORE, MD.

## BORING MACHINES

No. 2—3⅛" Bar Rockford
No. 2 Barrett, 5" bar

## BORING MILLS

30" Bullard, 1-turret head
36" Bullard, with side head
42" Bullard
72" Bickford.

## DRILLS

1, 2, 4 Spdl. Leland-Gifford.
No. 2-4 Spdl. Leland-Gifford, Motor Spindles. Power Feed
1, 2, 4 Spdl. Henry & Wright.
4 spdl. Demco. Power Feed
No. 2—6 spdl. Leland
No. 2 Colburn, 1 Spindle
No. 3 Baker 2 Spdl. Cyl. Borer
No. 5D Moline 4 Spdl. Cyl. Borer
No. 4—5 spdl. Foote-Burt.
No. 1 Baush Multiple
No. 3 Baush Multiple
5' Western Heavy Plain
8' Western Heavy Plain

## GEAR CUTTERS

No. 2 Bilton
No. 12 Barber-Colman Hobber.
No. ½, Pfauter Hobber.
No. 3-26" Brown & Sharpe.
No. 4—36" Brown & Sharpe
No. 4-48" Brown & Sharpe.
No. 5-48" Brown & Sharpe
No. 6-72" Brown & Sharpe.
No. 6-A-72" Cincinnati.
96" Newton Spur Gear
Nos. 6, 61, 62 Fellows
No. 36BM G. & E. Rougher
18" Gleason Bevel Generator

## GRINDERS

(*See page 312—special advertisement*
*Hill-Clarke Cylindrical Grinders*)

16"x32" Landis Crankshaft
No. 2½ Universal (Batl. Type)
12"x36" Norton Type "L" Multi-Purpose Universal
No. 5 Springfield Planer Surface
No. 2—18" Gardner Disc
No. 18 Bryant Internal
No. 60 Heald Cylinder

## MFG. LATHES

3½"x36" Fitchburg Lo-Swing.
3½"x60" Fitchburg Lo-Swing.
3½"x108" Fitchburg Lo-Swing.
8"x60" Fitchburg Lo-Swing.
No. 4AC LeBlond Auto. Crank

## ENGINE LATHES

18"x6' Bradford
21"x8' LeBlond Universal Turret
21"x10' LeBlond
24"x22' Lodge & Shipley, Taper Attach.
26"x8' Bridgeford
26"x10' Bridgeford
30"x12' Whitcomb-Blaisdell
20"-40"x10' Rahn - Larmon Geared Head Sliding Bed Gap.
60" New Haven Triple Geared

## MILLERS

No. 3 Becker-Brainard Plain.
No. 6 Becker Vertical
5" Pratt & Whitney Automatic
No. 33—36" Kempsmith Production
No. 4 Garvin Profiler
24"x24"x12' Ingersoll Adj. Rail.
24"x20' Ingersoll Double Faced
36"x36"x12' Newton Duplex.
38"x44"x20' Ingersoll Slab.
72"x16"x14' Ingersoll Slab.
No. 1 Smalley-General Thread.
No. 4 Lees-Bradner Thread

## PLANERS

24"x24"x6' Powell.
24"x24"x6' Rockford.
24"x24"x12' Gray.
30"x30"x8' American.
30"x30"x8' Powell.
36"x36"x8' Cincinnati
36"x36"x18' Cincinnati
36"x36"x12' American, 1 Hd.
36"x36"x12' American 2 hds.
42"x42"x14' Gray, 2 heads.
48"x48"x10' Niles-Bement-Pond, 2 heads.
48"x48"x12' Gray, Reversing M.D.

## PRESSES

No. 303 Bliss S.S., Geared.
No. 58 Toledo Nosing.
No. 42½ Pels Beam Shear
Type C Cleveland Punch & Shear

## TURRET LATHES

2¼"x26" Greenlee
3¼"x40" Greenlee
3"x36" J. & L. 2 spdl.
18" Libby, 3 9/16" H.S.
21"x8' LeBlond Universal
21" Gisholt, 3¾" H.S.
24" Steinle, 6¼" H.S.

## MISCELLANEOUS

15" Hendey Shaper
24" Mark Flather Shaper
No. 3-B J. N. La Pointe Broach
No. 4 J. N. La Pointe Broach
6" Saunders Pipe Machine
8" Landis Pipe Machine
12" Bignall & Keeler Pipe Mach.
60" Quickwork Rotary Shear
No. 7 Burr Keyseater, 72" Feed
6½' Avey Metal Bandsaw

# HILL-CLARKE MACHINERY CO.

## 645 W. WASHINGTON BOULEVARD, CHICAGO

# VICTOR'S BARGAINS IN

# Tungsten Carbide Tipped Tools

## Price $1.00 Each In Any Size

**New Low Prices. — Increase Production — Cut Operating Costs**

**Tools are tipped with Tungsten Carbide, and are suitable for machining cast-iron, brass, bronze, aluminum, non-ferrous materials (such as hard rubber, bakelite, fibre), and tough alloy steels up to 500 Brinell hardness.**

**Left—100 Series**

Left Hand-Reverse Image, Right Hand Shown

| Tool No. RH | LH | Shank Size |
|---|---|---|
| R-100 | L-100 | ¼x¼x2 |
| R-101 | L-102 | 5/16x5/16x2¼ |
| R-103 | L-104 | ⅜x⅜x2½ |
| R-105 | L-106 | 7/16x7/16x3 |
| R-107 | L-108 | ½x½x3½ |

**Below—300 Series**

| Tool No. | Shank Size |
|---|---|
| 300 | ¼x¼x2 |
| 301 | 5/16x5/16x2½ |
| 302 | ⅜x⅜x2½ |
| 303 | ½x½x3½ |

**Right—200 Series**

| Tool No. | Shank Size |
|---|---|
| 200 | ¼x¼x2 |
| 201 | 5/16x5/16x2¼ |
| 202 | ⅜x⅜x2½ |
| 203 | 7/16x7/16x3 |
| 204 | ½x½x3½ |

**STANDARD TUNGSTEN CARBIDE TIPPED TOOL BITS**

In lots of 12 assorted in any Series; 100-200-300 Series an extra 10% will be allowed; also in lot of 50 assorted 20% discount will be allowed.

**Sizes not listed as well as special TIPPED TOOLS will be quoted upon request. When ordering, state tool number and quantity desired.**

**We Carry Silicon Carbide Emery Wheels for Grinding Tungsten Carbide Tool Bits**

*SEND FOR OUR CIRCULARS*

## Victor Machinery Exchange, Inc.

**251 CENTRE STREET** **NEW YORK, N. Y.**

# DIAMOND POINT
## EMERY WHEEL DRESSERS

A very efficient tool for dressing Emery Wheels.
Diamonds are mounted in 7/16" diameter rods 6" long.

¼ KT. FOR USE ON 6" DIA. WHEELS OR SMALLER
$3.00 each net

½ KT. FOR USE ON 8" DIA. WHEELS OR SMALLER
$4.50 each net

¾ KT. FOR USE ON 10" DIA. WHEELS OR SMALLER
$7.50 each net

1 KT. FOR USE ON 12" DIA. WHEELS OR SMALLER
$10.00 each net

1½ KT. FOR USE ON 24" DIA. WHEELS OR SMALLER
$15.00 each net

2 KT. FOR USE ON 30" DIA. WHEELS OR SMALLER
$20.00 each net

MOUNTED FREE IN ANY DESIRED HOLDER

SEND FOR OUR CIRCULARS

**VICTOR MACHINERY EXCHANGE, INC.**
**251 Centre St., • New York City**

# VICTOR'S BARGAINS IN NEW
## Carbon, High Speed & Tungsten Carbide Tipped Lathe Centers

THESE CENTERS ARE GROUND AND HARDENED

| Taper | Whole Length | Net Prices Carbon | Net Prices High Speed | Net Prices Tungsten Carbide Tipped |
|---|---|---|---|---|
| 1 | 3 5/16 | $ .54 each | $1.55 each | $3.00 each |
| 2 | 4 3/16 | .65 each | 2.25 each | 5.00 each |
| 3 | 5 1/4 | 1.10 each | 3.25 each | 8.00 each |
| 4 | 6 3/4 | 1.60 each | 4.25 each | 12.00 each |
| 5 | 8 1/2 | 3.15 each | 8.25 each | 18.00 each |

## NEW DRILL SLEEVES
WITH MORSE TAPER SHANK

| | Net Prices |
|---|---|
| 1-2 No. 1 hole and No. 2 Shank | $ .45 each |
| 1-3 No. 1 hole and No. 3 Shank | .60 each |
| 2-3 No. 2 hole and No. 3 Shank | .50 each |
| 2-4 No. 2 hole and No. 4 Shank | .75 each |
| 3-4 No. 3 hole and No. 4 Shank | .75 each |
| 2-5 No. 2 hole and No. 5 Shank | 2.00 each |
| 3-5 No. 3 hole and No. 5 Shank | 2.00 each |
| 4-5 No. 4 hole and No. 5 Shank | 2.00 each |
| 4-6 No. 4 hole and No. 6 Shank | 7.00 each |
| 5-6 No. 5 hole and No. 6 Shank | 7.00 each |

## NEW
SLEEVES WITH BROWN & SHARPE TAPER

| Inside | Outside | Our Price Net Each |
|---|---|---|
| 4 | 7 | $2.00 |
| 5 | 7 | 2.00 |
| 7 | 9 | 3.75 |
| 7 | 10 | 4.00 |
| 7 | 11 | 5.00 |
| 9 | 10 | 4.50 |
| 9 | 11 | 5.50 |
| 9 | 12 | 7.25 |
| 10 | 11 | 7.50 |
| 10 | 12 | 7.50 |

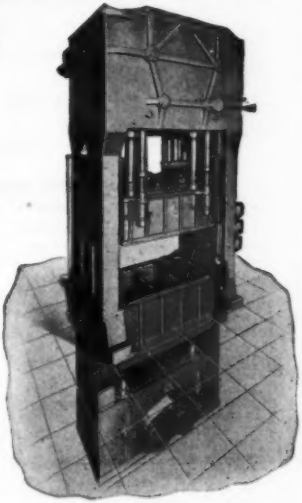
| Morse Inside | B & S Outside | Our Price Net Each |
|---|---|---|
| 2 | 9 | $2.75 |
| 3 | 10 | 3.75 |
| 3 | 11 | 4.50 |

## VICTOR MACHINERY EXCHANGE, Inc.
**251 CENTRE STREET** **NEW YORK CITY**

*SEND FOR OUR CIRCULARS*

# "IMMEDIATE DELIVERY!" MODERN LARGE PRESS

## CLEARING CRANKLESS TRIPLE ACTION, 4-POINT SUSPENSION TYPE



**Combined Cap. Blankholder & Plunger Slide, 1350 tons**

- **Bed 84'x133'**
- **All Steel Construction**
- **Self-Contained**
- **Motor Drive**
- **All Gears Enclosed Running in Oil**
- **All Drives and Ram Adjustments Operated from One Control Board**
- **Wgt. Approximately 518,000 lbs.**

**JUST RELEASED!**

**ANGLE IRON SHEARS:** Covington 6x6x½", dble. end. Pels Angle & Beam Shear, 8x8x½"
**AUTOMATIC SCREW MACHINES:** No. 1, 2, 3 Manville; No. 00 B&S; 2" Model B Cleve.
**BORING MILLS:** Horiz. 12" Niles Cyl. Boring Machine, double end; 2½" Cleveland
**VERT.:** 36" Bullard Rapid Prod.; 72" Bullard
**GRINDERS:** Surf. 14" P & W Vertical 15x15"x96" Norton, Springfield Planer Type
**HAMMERS—BOARD DROP:** 1200 lb., 1000 lbs., & 800 lbs. Billings & Spencer, Bliss & W.W.
**HELVE:** 100 lb. & 200 lb. Bradley
**LATHES:** Floor, 36"x28' Bridgeford, with raising blocks, will swing 62"; 36"x16' Schumacher & Boye; 52"x22' Fifield; 30' Pit Lathe, 156" face plate
**TURRET:** 24" Gisholt; 28" Pond; 22" Libby Universal; 6½" Steinle gd. hd.
**MILLS:** Planer Type; Ingersoll, 30x144", 2 heads; 4 head, 14' bed, 6" spindle
**PLANERS:** Pond, Table 27' Long 101" Bet. Housings; 48"x48"x10' Cincinnati; 36x36 x12' Gray; 20' Niles Plate; 36x30x10' American; 26"x8' Cleveland openside
**PRESSES:** Hyd. 100 ton Litchfield Wheel; 150 ton Niles Wheel; 25 ton Horiz.
**DOUBLE CRANK TOGGLE:** No. 409 Bliss, 108" bet. housings; Tie Rod; Air Cushions; No. 268 C Toledo, Twin Geared 97" between housings; Tie Rod
**PRESS BRAKES:** 30' Birdsboro, cap. approx. ½" plate; self-contained; Est. wgt. 200,000 lb.; 10x5/16" OHL; 6' 7/32"
**ROLLS:** 20' Alliance Pinch Type 18' & 12' Wickes, Pyr. Type, drop end; M.D. 12½" H. & J., balance bar; 10' Wickes Vertical
**SCRAP BALER:** Galland & Henning Hydraulic; 60"x24"x18", with 30 H.P. motor, hopper, compressor, pump and tank
**SLITTER GANG.** 72" Yoder M.D.
**UPSETTER:** 3½" Ajax


INTERSTATE Machinery Co., Inc.

1449 WEST PERSHING ROAD PHONE YARDS 5800 CHICAGO, ILLINOIS

# EMCO REBUIL

### GEARED HEAD ENGINE LATHES

22"—100 H.P. American Super Lathe, 4 m.d., for carboloy
16"x7' Cisco, m.d., collet attach.
16"x8' Reed
18"x8' American, m.d.
18"x10' American, m.d.
18"x13' Lehmann, m.d., taper
20"x14' Hendey, taper
24"x8'6" Bridgeford
24"x18' Lodge & Shipley, taper
26"x16' Bradford, taper
26"x18' Bridgeford, taper
27"x21'9" Bridgeford, m.d., taper

### CONE HEAD ENGINE LATHES

14"x6' Bradford, collet attach.
16"x6' Bradford
15"x6' Willard
16"x8' Bradford
16"x8' Cincinnati
18"x6' Bradford
18"x8' Mueller, taper
18"x10' Springfield
18"x12' Barker
18"x12' Monarch
18"x14' LeBlond, taper
19"x8' LeBlond, taper
19"x12' LeBlond, taper
20"x10' Davis
20"x10' Lodge & Shipley
21"x8' LeBlond, taper
21"x10' LeBlond
21"x16' LeBlond, taper
22"x12' Greaves-Klusman
22"x13' Niles
24"x10' Bridgeford
24"x10' Canada
24"x10' LeBlond
24"x10' Whitcomb-Blaisdell
24"x11' Chard
24-48"x16' McCabe 2 in 1
24"x16' Schumacher-Boye
24"x26' American, taper
26"x18' Schumacher-Boye, taper
27" raised to swing 38'x16' American, tap.
30"x20' Schumacher-Boye
36"x10' Schumacher-Boye

### BORING MILLS

30" Colburn, 1 head
42" Gisholt, 2 heads
42" King, 2 heads
48" Niles-Bement-Pond Car Whl. Bor., belt
51" Baush, 2 heads
7' Niles, cone, friction type
No. 2 Barrett Cylinder Borer, 5" bar
No. 4 N-B-P Horizontal, m.d., 5½" bar
Niles-Bement-Pond Cyl. Bor., 12" main bar

### MILLING MACHINES

No. 2 Garvin Lincoln Type, cone
Carter & Hakes Mfg., cone
Gooley & Edlund Briggs Type, belt
Newton C17 Vertical Slab, m.d.
C66A Newton 3 spindle Continuous, s.p
Putnam Briggs Type, cone
30"x28"x8' Ingers. Pl. Type, 4 spindle
40" Ohio Tilted Rotary, m.d.
48" Oesterlein Tilted Offset, m.d.

### GEAR MACHINERY

No. 61, 62, 615, 645 Fellows
6", 18" Gleason Strt. Tooth Bevel Gene
Gleason Spiral Bevel Gear Rougher, s.
16" Cincinnati Hobber, m.d.
16" Gould & Eberhardt Gear Cutter
D. E. Whiton No. 1—25" Full Unive
Spur & Bevel
No. 3—26" Cincinnati Gear Cutter
No. 3—26" Brown & Sharpe Spur
No. 3—36" Brown & Sharpe Spur
No. 3 Heavy Brown & Sharpe Spur
No. 4—36" Brown & Sharpe Spur
No. 4—48" Brown & Sharpe Spur
No. 5A Lees-Bradner Gear Generator
No. 6—60" Brown & Sharpe Spur
No. 6—72" Brown & Sharpe Spur
Gleason Bevel Gear Tester
Cross Gear Tooth Rounder
20" Rochester Gear Tooth Rounder
Schuchardt & Schutte 10" Gr. Tooth

### RADIAL DRILLS

2½' Avey Sensitive
3' American Sensitive
3' Carlton Sensitive
3½' Fosdick Plain, gear box
4' Cincinnati Bickford Plain, d.c. drive
4' Cincinnati Bickford Plain, gear box
4' Hammond Jack Knife
4' Niles-Bement-Pond Semi-Univ., d.c.
4' Prentice Plain, cone
4' Ryerson Plain, gear box
5' Dreses Plain, gear box, 15" col.
5', 6' N-B-P Semi-Universal, d.c. m.d.
5', 6' N-B-P Semi-Universal, gear box
5' Prentice Plain, cone
6' Dreses Plain, gear box
7' Dreses Plain, gear box
7' Fosdick Plain, cone

### TURRET LATHES AND SCREW MACHI

No. 0 Brown & Sharpe Hand, cone
No. 3 Foster, cone, Timken Bearings
No. 4 Bardons & Oliver, cone
No. 4 Foster, cone
No. 6 Brown & Sharpe Hand, cone
2¼x24" Jones & Lamson Steel hd., bar

*PARTIAL LISTING ON*

# THE EASTER

**1001 TENNESSEE AVENUE.**

# MACHINE TOOLS

¼x24" Jones & Lamson, bar
x36" Jones & Lamson Stl. Hd., m.d., chkg.
x36" Jones & Lamson, m.d. chucking
x36" Jones & Lamson, m.d., bar
spdl. 3x36" Jones & Lamson, m.d., chkg.
¼x40" Greenlee Flat Turret, cone, bar
6" Warner & Swasey, cone
8" Acme, cone
lo. 4R Acme Universal, chucking
1", 24" Gisholt, chucking
6" Libby Type C, chucking

**AUTOMATICS**

⅛" Model A Cleveland
¼-1½" Cleveland Model B
¼" Hartford
spindle ⅞" Cleveland
½" Cleveland Model A
" Cleveland Model A
lo. 5A, 6A Potter & Johnston Automatics
lo. 6D Potter & Johnston Auto. for b.d.w.
lo. 23, 24 New Britain Automatics

**GRINDERS**

lo. 70 Heald Internal, belt
lo. 6 Bryant Chucking, belt
lo. 1 Fraser Lapper, 26" plate
lo. 3 Brown & Sharpe Planer Type Surf.
ovell-Hanchett Knife No. 500 UK
8x48" Diamond L.D. Face, m.d.
0x84" Diamond H.D. Face, m.d.
4" Bridgeport Knife
0x20" No. 1 Landis Universal, belt
2x48" No. 3 Modern Universal, belt
inc. Centerless Valve Seat Grdr., m.d.
lo. 50 Heald Cylinder, hydraulic
lo. 55, 60, 65 Heald Cylinder
x32" Norton Plain Cylindrical, m.d.
lo. 14—10x18" Brown & Sharpe Plain, belt
0x30" Queen City, m.d.
0x36" Landis Integral Cam, m.d.
0x36" Norton Plain, m.d.
0x48" No. 14 Brown & Sharpe Plain, belt
0x50" Norton Plain, m.d.
0x52" Landis Plain, m.d.
2x18" Cincinnati Plunge Cut, m.d.
2x36" Cincinnati, belt
2x36" Cincinnati, m.d.
2x36" Modern, m.d.
2x42" Landis, belt
2x48" Modern, m.d.
2x72" Cincinnati, 3 m.d., hydraulic
6x52" Landis, m.d.
lodern Chaser Grinder, belt
lo. 1 Cincinnati Universal Tool & Cutter
lo. 4, 5, 31 Oliver Mtr. Dr. Drill Pointers
lo. 23 Brown & Sharpe Gr. Cutter Grinder
isholt Universal Tool, belt
leason Cutter, belt
ould & Eberhardt Gear Cutter, belt
andis Chaser, belt

**HAMMERS**

Pettengell Bumping, belt
60 lb. Bradley Rubber Cushioned Helve
80 lb. Bradley Rubber Cushioned Helve
100 lb. Little Giant, belt
200 lb. Bradley Upright Strap, belt
350 lb. Niles-Bement-Pond Steam, new (3)
550 lb. Bement-Miles Steam
650 lb. American Eng. Steam
1500 lb. Morgan, steam
2000 lb. Erie Double Frame Steam
2000 lb. Niles Single Frame Steam

**PLANERS**

24" Cincinnati Crank, 1 head, m.d.
24"x24"x12' Chandler, 2 heads, belt
36"x36"x10' Cincinnati, 3 heads, belt
36"x36"x10' Whitcomb-Blaisdell, 2 hds., bt.
36"x36"x13' N.-B.-P., 1 rail, 1 side hd., belt

**MANUFACTURING LATHES**

8"x60" Lo Swing Mfg. Lathes, m.d., hardened ways, 2 carriages
8x60" Lo Swing Mfg. Lathe, m.d., hardened ways, 1 carriage
3x80" Lo Swing Mfg. Lathe, s.p.d., 2 carriages
8x36" Lo Swing Mfg. Lathe, s.p.d., 1 carriage
12"x5' Sebastian Geared Head Turning Lathe
15"x6' Automatic Threading Lathe
16"x6' Rockford, cone
18"x8' Chard Production, cone
20"x8' American Turret, cone
30" Streit Pulley Turning Lathe
Niles-Bement-Pond Quartering Machine, new
Niles-Bement-Pond Center Driving Car Wheel Lathe, new
Niles Axle Lathe, cone

**BOLT CUTTERS**

No. 11S Rickert-Shafer Automatic Threading, m.d.
9/16" Landis 2 spindle Bolt, m.d.
2 spindle 1" Acme, cone
3 spindle 1" Acme, cone
1½" Landis, cone
1½" Landis 2 spindle, m.d.
American Bolt Heading Machine, belt

**PIPE MACHINES**

No. 2 Bignall & Keeler, m.d.
Red-E-Haul Portable 2", m.d.
2" No. 70 Jarecki, m.d.
2" Landis Double Head Pipe & Nipple, belt
2" Merrell, m.d.
4" Eaton, Cole & Burnham, belt
No. 4 Bignall & Keeler, m.d.
8" Bignall & Keeler, belt
8" Landis, m.d.
12" Landis, m.d.

*ND US YOUR INQUIRIES.*

**MACHINERY CO.,**

**CINCINNATI, OHIO**

# "FALK" MEANS IN STOCK

**AUTOMATICS:**

7/8" Cleveland "B" ser. 32543
1¼ Cleveland "A" ser. 25781
2¼ Gridley "F" 4 spindle 8021
2" Nat. Acme "B" 4 spl. 13197
4¼ Cleveland "A" ser. 17258

**BRAKES:**

8'x14 ga. Hand Bending D&K
8'x18 ga. Hand Bending D&K
3'x14 ga. Box & Pan D&K
5'x14 ga. Box Pan D&K

**SHEARS:**

10'x¾ Wais & Roos, 24" Gap
8'x3/16 Bliss 18" Gap
8'x14 ga. Stoll
4'x3/16 Niagara No. 748
6'x18 ga. Stoll 15" Gap
No. 0 Buffalo Bar Shear 1¼" Rd. Cap, 1" Sq, 2½x2½x½ Angles 2½x½" Flats
No. 1 Pels Hand Univ. Iron Wkr.

**DRILLS:**

Foote-Burt No. 21 Hy. 18" sp. tr.
Cin.-Bick. 28" with Tapping
Baker No. 216 Split Column
Snyder 36" 28" 24"
Barnes 24" 21" B. G. P. F. Sliding Heads
Aurora 24" B. G. P. F. Sl. Hd.

**BORING MILLS:**

3" Bar Universal Horizontal, Table 24x48, Motor Driven
3 Boring Bars, Perfect condition
36" Bridgeport Vertical, 2 heads
42" Colburn Vert. 2 hds. Rd. Tr.
72" Colburn Vert. 2 heads, Power Traverse

**AIR COMPRESSORS:**

4½x4½ DeVilbis Vert. Water cooled, (2) 6x6 Bury Horiz.; 6x6 Curtis Twin Vert. water cooled; 9x8 Blaisdell Horiz; 10 x 8 Laidlaw horiz.; 12 x 10 Ingersoll-Rand, E R I, Horiz; 10x8x4 American Tandem 250 lb. Press cap. with intercooler. (2) 14x12x10 American 2 Stage with Intercooler, 500 CFM

**BULLDOZER:**

No. 4 Williams & White

**PRESSES:**

No. 166 Consolidated, Dble. Cr., Red 40x36 6" stroke, Marquette Cushions; No. 5 American Str. Side 75 tons, 2" stroke; No. 37½ Bliss, Straight Side; 75 tons, 4½" stroke; No. 21½ Bliss (2) O.B.I. Geared; No. 18 No. 19 No. 20 No. 20B No. 21 Bliss O.B.I. Plain; No. 2 No. 3 No. 5 No. 6 Niagara O.B.I. No. 3 No. 5 Consolidated O.B.I. No. 4 V&O Motor Dr. O.B.I. No. 2½ V&O., O.B.I., No. 2 No. 3 American Can; No. 4 Adriance O.B.I. No. 25 Niagara Arch, No. 30 Bliss, Arch, No. 702 Bliss Flat Trimmers (2) 16 Bliss Horn, M.D. No. 1 Bliss Toggle, 3 tons General Flex. 12 Ton Fox Flex. No. 75 Toledo Pl. No. 75 Toledo Geared, No. 6 Waterbury O.B. No. 3R Marquette, Geared, air cushion, No. 3 Greenerd Broach

**DRILLS—Sensitive High Speed, Ball Bearing:**

6 Spindle Avey No. 2
4 Spindle Avey Leland Gifford, Foote-Burt No. 2 (8)
3 Spindle Avey No. 2
2 Spindle Avey No. 2 No. 3, Leland Gifford No. 2, Henry, Wright No. 2, Edlund No. 2B, Foote-Burt No. 2
1 Spindle Avey Fosdick L & G Sipp, H&W, Edlund, No. 0 No 1 No. 2 No. 3 (Buffalo New Drills in Stock)

**DRILLS—MULTIPLE:**

Natco No. 11-8 spindles
Fox No. 2-8 spindles
Harrington 12 spindles, drilled for 20, like new

**RADIAL DRILLS:**

3' Bickford, 3' American, 3' Dreses 3' Mueller
3½ 30" 4' Dreses, 4' NBP Semi Universal
7' Pond Belt dr. 3' Carlton Ball Bearing, Sensitive, M. D.

**SHAPERS:**

28" G&E "Invincible" (2) 24" G&E cone, 24" G&E, spd.
26" Smith & Mills, 24" Cincinnati, 24" Stockbridge
20" American, 20" Cincinnati, 16" Smith & Mills
15" Steptoe, 15" Potter & Johnson, 16" G&E Motor Driven
20" Hendey Friction, 20" Ohio BG, 14" G&E

**LATHES:**

42"x15' Pond triple Geared, 24"x16' Greaves-Klusman
26"x12' Crawford-Erie, 20"x8' American, M.D.
20"x10' Davis, 21"x8' LeBlond with Turret on Carriage
19x8' LeBlond Heavy Duty Production, 18x8 Mueller
18x8 Chard 18x8 Cisco, 18x8 Hamilton
18x12 Hamilton, 18x12 Prentice 17x8 Sidney
16x8 Cincinnati Taper, 16x8 Cincinnati
16x10 Reed Prentice; 16x8 Reed 16x6 American Inside lead screw 16x6 American Geared Head
16x6 American Cone Ser. 42346, 16x6 Pratt & Whitney
16x6 Lodge & Shipley Geared Head, 16x6 L&S cone
16x6 Monarch, 14x6 Rockford 14x6 LeBlond
14x6 Standard Lathe works 14x6 Monarch
14x6 Greaves & Klusman 13x6 Mulliner-Edlund
13x6 Willard Geared Head, 12x5 Mulliner-Edlund
10"x4½' Pratt &Whitney Toolmakers Lathe, Taper Attachment Draw Bar & 7 Collets, 8"x36" American Watch Co. Precision Bench Lathe, compound, Collets, etc.

**MILLING MACHINES:**

3A Brown & Sharpe Universal, No. 3 Ohio Plain, No. 2 Cincin. Universal, No. 2 Van Norman, No. 1½ B&S, Plain, No. 1½ Cincinnati Plain, No. 1½ Rockford Plain, No. 1 Kempsmith Universal, (2) No. 1 Kempsmith Plain, No. 4 Van Norman (2) No. 0 Van Norman (2)

4—No. 5 Stark Precision Bench Millers, Plain, mounted on substantial Wood Benches and arranged for motor drive, No. 3 Burke Bench Millers on Pedestals (2); No. 4 Burke Bench Mill with Power feed on Pedestal; No. 1 Toledo Hand Miller, B. Bearing Flywheel on Spindle, No. 6 Whitney Hand Millers (8) No. 4 Hendey Lincoln Production Miller; 16" Gooley & Edlund Briggs Model "A" Production Miller; No. 6 Jackson Vertical Miller and Die Sinker

**THREAD MILLER:**

6x14 Pratt & Whitney
4" P&W Spline Miller (2)
2" P&W Spline duplex Miller

**GEAR CUTTERS**

48" Gould & Eberhart
No. 12 Barber Colman
18" Schuchart & Schutte
Whiton Automatic Spur;

**RIVETING HAMMERS:**

No. 6B No. 5½B H.D. No. 4A No. 4A M.D.
No. 3A H.D. No. 2A No. 1½B Rochester High Speed Hammer Co.
No. 3R Marquette Riveting Press No. 0 No. 80 Grant
15 lb. Bradley Upright 50 lb. DuPont Upright
400 lb. Miner & Peck Belt Drop 200 lb. Bliss Board Drop, Poppet Base; (new)

**PIPE MACHINES:**

2" Chicago Motor Dr. 2" Jarecki 2" Landis, 4" Curtis 6" Williams "Rapiduction" 6" Jarecki 12" Saunders, Bolt Threaders, 1¼ Landis double head 1¼" National Geared Head, dble. 2½" Acme, full set dies

***Partial List Only. Send Us Your Inquiries.***

**FALK MACHINERY COMPANY** 15 WARD STREET ROCHESTER, N.Y.

# For Immediate Delivery

### LATHES

3—Porter Cables
14"x6' Hendey, Taper & Relieving Attachments
14"x6' Carl Jamison
14"x6' Prentiss, Geared Head
Monarch 14"x8', Q.C.
14"x10' American, M.D.
Lodge & Shipley, 16"x6', Q.C., M.D.
Pratt & Whitney, 16"x8' Geared Head Taper Attachment
Hendey, 16"x10', M.D.
Lodge & Shipley, Q.C., M.D., 16"x10'
16"x24"x10' Willard Geared Head
18"x6' American
18"x8' Lodge & Shipley, Geared Hd.
18"x8' Superior, M.D.
LeBlond 19"x38"x10', Geared Head, M.D., Sliding Bed
American 20"x8' Q.C., D.B.G.
American 24"x10'—Q.C., M.D. Standard Equipment
24"x12' Geared Hd., M.D., American
J. J. McCabe 24"x48"x18', H.D.

### GRINDERS

Bath—Universal No. 2½
6x18 Landis—Self-Contained, M.D.
No. 12 Pratt & Whitney, Vert., M.D.
2—No. 3 Van Normans M.D.
Storm, 16x18—M.D. 2 motors
No. 85 Van Norman, M.D.
No. 96 Van Norman, M.D.
No. 1 Fraser—Universal
No. 11 Brown & Sharpe
No. 10 Bryant—Internal

### BORING MILLS

36" Bullard Vertical
Lucas, 2¾" bar, M.D. Horizontal

### DRILLS

6' American Universal Radial Drill, M.D.
5' Fosdick
2—Allen 2 spindles H.S., B.B.

### SHAPERS

28" Flather—M.D., S.P.D.
24" Cincinnati, M.D.
2—16" Barker, MD.

### TURRET LATHES

Gisholt 6¼"
Greenlee 3½"
3—3x36 J & L Bar & Chucking Eqp.
6A Potter & Johnston
¾x3 Cincinnati Auto., 5 spindles
2—¾"x4 sp. Gridleys
2—⅞" 4 sp. Gridleys
2—1¼" 4 sp. Gridleys
1" 4 sp. Acme, No. 53
1-⅝" 4 sp. Acme, No. 55
2¾ 4 sp. Acme, No. 56

### MILLERS

No. 2 Owens—Universal, M.D.
No. 3 Cincinnati—Plain
1—No. 0 Van Norman
No. 1 Grand Rapids, B.G., M.D. with heads
No. 1 Brown & Sharpe—Plain
No. 3 LeBlond 3 step D.B.G.—Plain
Profiler, Power feed to rotary table

***This is a partial list. Write us your requirements.***

## S. & S. MACHINERY CO.

**207 Centre St., New York, New York**

# AVAILABLE!!

**REBUILT MACHINES IN STOCK**

26" Libby Geared Head Full Univ. S.P.D. 4½" hole in spindle—chuck, face plates, pot chucks, boring bars, tools
11"x4' Seneca Falls Short cut Lathe M.D.
No. 1 Cincinnati Univ. Mill M.D.
No. 1½ Brown & Sharpe Univ. Mill M.D.
No. 2 Owens Univ. Mill M.D.
No. 2½ LeBlond Heavy Duty Univ. Mill M.D.
No. 3 Cincinnati Plain Mill M.D. with Halco Hi-Speed Vert. Head
No. 310 Baker H.D. Drill S.P.D.
6"x15" Fitchburg Plain Cyl. Grinder. Belt drive. Can be motorized
24"x30"x8' Cincinnati Planer, Box Table M.D.
No. 16 Blanchard Grinder 26" chuck —25 HP motor 1924

**OTHER MACHINES IN STOCK**

**MILLS**

2-No. 24 Bliss Vertical Die Sinkers with long power feed to 24" dia. rotary table. Can be used as vertical Mills Fine Condition
2-No. 2 Pratt & Whitney Vert. Die Sinkers
18" Cincinnati Automatic
3-Hendey & Becker Lincoln Type
2A-Becker Vertical—Rotary table
No. 5 Becker Vert.—Extra long table
No. 5B Becker Horiz. Plain

**DRILLS**

4' Niles Bement Pond Full Univ. Radial No. 4 M.T—4 speed AC MD. with M & Controller—Box Table 11" Col. Rev. Spdl.
2½'—3'—4' Plain Radials M.D.
5 & 6 Spdl. Moline Hole Hogs No. 3 M. T.
1-2-4 Spindle L & G—H & W Sens.

**Our Engineering Service will aid in the Selection of Good Used Production Machines we have available.**

4 Spdl. H.D. Foote-Burt Reaming Machine No. 5 M.T.—M.D.

**LATHES**

12"x5' Hendey—Taper—Chuck
12"x6' Carroll Jamieson—2 chucks
16"x6' American—Taper—2 chucks
18"x8' Rockford—Taper—M.D.
18"x8' American—Chuck
20"x10' Schumacher-Boye—Taper
26"x16' Bridgeford & Gleason—Taps.

**GRINDERS**

No. 60 Heald Knee Type Internal
Capitol Internal—M.D.
Churchill Internal—2 motors, Power feed—Rebuilt. Fine tool
2-No. 6 Bryant Internal—Extra spdl.
No. 18 Bryant Internal
2-36" Bath Univ. Head and Tailstock
1-Modern Plunge Cut Form Cyl. Live centers—Hopper feed. Never used M.D.
6"x18" Landis Plain—S.P.D.
No. 96 Van Norman Piston—M.D.
No. 3 Diamond Surface—48" travel
No. 11 Brown & Sharpe Plain & c/s.
10"x36" Landis Plain M.D.

**MISCELLANEOUS**

3-No. 12 Barber Colman Gear Hobs.
½" National Bent Tapper
No. 7 Foster Turret Lathe—Power cross feed and tools
No. 10 Bardons & Oliver Tur. Lathe —Power cross feed—M.D.
9"x9" Peerless Shaping Saw M.D.
Taylor Winfield Butt Welders—Like new. 20 KVA—M.D.
36"x36"x8' Detrick & Harvey Open-side Planer—2 Rail Heads, 1 Side Head. Self-contained M.D.
4-No. 7 L S Fellows Gear Lappers, M.D. like new
Model D Hall Planetary Mill
1¼" and 2 3/16" Model A Cleveland Automatics

**A Well Managed and equipped Department for the Reconstruction of Machine Tools is at your Service.**

## R. A. VINE'S MACHINERY WAREHOUSE

**652 West Willis Avenue** **Detroit, Michigan**

# . . . IN STOCK

**AUTOMATICS**
1-¼" Model A Cleveland
1-¼" Model F Gridley

**BROACHES**
No. 3 LaPointe

**DRILLS**
No. 2 Colburn S.S.
24" Barnes, Power feed
36" Cincinnati, with taper
No. 12 Natco Multiple Spindle
No. 13 Natco Multiple Spindle
Natco 3 way Horizontal multi. spdl.

**GEAR CUTTERS**
15" Gleason Spiral Bevel
18" Gleason Gear Tester

**GRINDERS**
No. 70 Heald Internal
22"x84" Pratt & Whitney Surface
No. 2 Brown & Sharpe Universal
No. 20 Bryant Chucking
16"x50" Norton Crankshaft
20 A Bellevue Drill
Ingersoll Cutter, Tub Type

**LATHES**
14"x6' Monarch, C.D.
16"x6' Cisco, C.D.
16"x6' Hamilton, C.D.
20"x16' Monarch, C.D.
21"x8' LeBlond—C.D.
22"x10' American, G.H.
26"x10' McDougal, C.D.
3½x60" Fitchburg Lo-Swing—G.H.
11"x5' LeBlond, G. H. Production
14"x6' LeBlond, C. D. Production
18"x7' Chard, C. D. Production

**LATHES—Turret**
No. 1B Foster
Model C 26" Libby
No. 1 Warner & Swasey
No. 4 Warner & Swasey
No. 6 Warner & Swasey
No. 5 Foster
No. 7 Bardons & Oliver
No. 9 Bardons & Oliver
No. 6A Potter & Johnston Auto.

**MILLS—Plain**
No. 4 Cincinnati, S.P.D.
No. 2B Brown & Sharpe S.P.D.
No. 3 Cincinnati, C.D.
No. 14A Garvin, C.D.
No. 1 Bristol, Hand
No. 6 Whitney, Hand
18" Cincinnati Manufacturing

**MILLS, UNIVERSAL**
2A Garvin, C.D.

**MILLING MACHINE ATTACHMENTS**
No. 3 Cincinnati Vertical Head
No. 2 Brown & Sharpe Vertical Hd.
No. 2 Rockford Vertical Head
No. 3 Brown & Sharpe Slotting Att.

**OIL GROOVER**
Wicaco Continuous

**PLANERS**
30x30x8' Cincinnati
60x60x11' Gray

**PROFILERS**
No. 13 Pratt & Whitney

**ROLL FORMING MACHINE**
Hamilton—8 stand

**SAWS**
12"x16" Peerless, M.D.
No. 4 Atkins Band—M.D.
No. 6 Nutter & Barnes
No. 12 Higley Cold Cut

**SHAPERS**
16" Hamilton, C.D.
20" Cincinnati, C.D.
24" Cincinnati, C.D.
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28" Gould & Eberhardt S.P.D.

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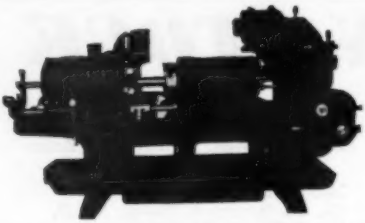

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Rail, No. 2 Foote-Burt 4-spindle
Prentice, 4-spdl. high-speed
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Allen 3-spdl., BB., cap. 1"
Demco DAH ¾" bb. M.D.
14" U. S. $35.00
20" Barnes B. G. & P. F.
20" Barnes, camel-back
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28" Hamilton sl. hd. BG & PF.

**GRINDERS:**
Disc, No. 0-20 Besly
Disc, No. 41 Besly, motor dr.
Disc, No. 220 Badger & press
Drill, New Yankee, D.E.
Elec., Hisey-Wolf 3-6 BOA BB
Flex. shaft, RA 5 Haskins
Emery, DE, Norton 24"
Emery, DE St. Louis 18"&20"
Internal, Madison:
Surface, No. 1 La Salle.
Wet tool, Springfield, 27" wheel

**LATHES:**
26"x14' Niles, PCG
22"x10' Whitcomb-Blaisdell
20"x8' LeBlond QCG, DBG
20"x8' Bradford, PCG MD.
18"x8' Rahn & Mayer PCG
16"x8' Fay & Scott QCG
14"x6' Rumsey, PCG
10"x42" Atlas, bench type, No. H-42, 1/3 HP. 110 V motor

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2x24" Jones & Lamson
12" Reed-Prentice BG

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Cam Drawing, 69-N Bliss
Foot, Famco and No. 4 Swaine
OBI, Weld, 1350 lbs.
Punch, No. 5 Bliss Stiles
No. 20 Excelsior 1" in ¼"

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SE W-W 14½, 25" thr. 1 in 1"
Rock River L, 24" thr. ½ in ½"
DE 1-10 Badger ½ in ½", 10" thr.

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Cold, Higley, 18" saw, No. 14
Hack, No. 3 Robertson 6x6"
Hack, No. 14 Atkins 6x6"

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16" Milwaukee B.G.
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26" Hendy planer type dr.

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Pipe, 4" 2-A Williams

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No. 33 New Britain chucking
No. 34 New Britain chucking
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Pratt & Whitney Worm
14" Pratt & Whitney BB surface
Hutto MD honer
Norton lappers, type 15
No. 75 Heald internal
No. 6 Bryant internal
24" No. 84 Gardner disc
53". No. 24 Gardner disc
No. 3 Barber Colman hob

### ENGINE LATHES

14"x6' Monarch
14"x6' LeBlond
14"x8' Lodge & Shipley
14"x8' Monarch
16"x6' Monarch
16"x8' American
18"x6' Hahn Larmon
18"x8' Walcott
19"x8' Sidney
20"x10' American
20" (22") x10' Davis, dbl. b-gd.
24"x10' Schumacher & Boye, dbl. back gears, taper att.
24"x10' LeBlond heavy duty, dbl. back gears, taper att.
24"x10' Hendey stand. chge gr.
24"x10½' New Haven
24"x12' Lodge & Shipley
24"x14' Schumacher & Boye
24"x16' Schumacher & Boye dbl. back gears, taper att.
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36"-44"x22' Wickes Q.C.G.

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16" Warner Swasey
Nos. 4, 6 & 9 Foster
No. 4 Acme
24"x26" Acme
No. 4 Bardons
24"x24" & 3"x36" Jones & L.
24" Bullard vertical

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30" Bullard single turret
36" Niles car wheel
42" Niles
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60" Colburn

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24"x24"x24" Cincinnati crank
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24"x24"x6' Woodward & Powell
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10'x10 ga. Chicago press brake
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No. 2½ Bliss O.B.I.
No. 4 Wat. Farrel O.B.I.
No. 62 Bliss Openback
No. 76 Toledo openback
No. 6 Wat. Farrel openback
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44" Loeffler dbl. cr., 88 ton
No. 65 Bliss Consolidated
No. 7 Rockford
No. 8-7 Zeh & Hahnemann
Nos. 55½ & 57S Toledo
No. 30½ Bliss arch frame
No. 30 E Cleveland, 1300 tons
No. 180 Toledo toggle
No. 796½D Toledo toggle
750 ton Baldwin Southwark triple action hydraulic
No. CA 14 Ferracute horn
No. 41A Toledo horn
No. P2 Ferracute
No. 2 Standard screw
150 ton No. 661 Toledo coin
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7" Rhodes
15" American
16" Walcott
20" Smith & Mills
22" Ohio
24" Gould & Eberhardt
24" Cincinnati
24"Rockford
24" Cincinnati shaper planer
48" Morton draw cut

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10'x10 ga. Chicago press brake
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Gear Shaper, No. 77 Fellows
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Roll, No. 1A Ajax forging
Saw, 7", No. 14 Higley
Shear, 72"x14 ga. Stamco
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1½" Millholland Turret Lathe

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No. 6—72" Brown & Sharpe Gear Cutter
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**HAMMERS**—Mayer 50-lb.; W & W 165 lb.; Kane & Roach 70 lb.; Beaudry 150 lb.; Beaudry 200 lb. Upright Helve

**KEYSEATERS**—Mitts & Merrill No. 5 vert. Davis No. 1; M. & M. No.0; M. & M. No. 2.

**LATHES**—Monarch 16"x10' M.D.; Lehmann 18"x9'; American 34"x18' Q.C.G. M.D. Hvy.; Amer. 22x8'; Davis 22"x10'; L & S 20"x10'; S-B & E 20"x10' q. c. g; Flather 22"x10'; LeBlond 16"x8'; Gleason 45"x12"; Monarch 16"x8' (2); Ryerson 20x10', m.d.; S.B.E. 30"x12' Q.C.G. Hendey 16"x8' C.H.; Hendey 16"x10' grd. hd.; Sidney 18"x8' and Flather 16"x8'. L. & S. 16"x8' M.D.; S. Bend 16'x8'

**MILLING MACHINES**—Ohio No. 29, Ohio No. 20, Hendey No. 3, B & SNo. 3, LeBlond No. 3H, Cin. No. 1 s.p.d. Plain; Cleveland; No. 2, s.p.d. Plain; Owen Duplex; Ingersoll M.D. Slab Miller 4 hds.; Newton Vert. with rotary table; Becker No. 2 Vert.; Ohio No. 24 Plain; Rockford No. 0 Plain; B. & S. No. 3 S.P. D. Vert.; Becker No. 4 Vert.

**THREAD MILLERS**—Smalley General No. 23-A; Moline No. 10

**PLANERS**—Pond 32"x34"x10'; Sellers 36x36x12'; Pease 26"x26"x9'; Cincinnati 36"x36"x10' 2 Hds.

**PIPE MACH.**—Williams 8" cap.

**PUNCH PRESSES** — Ferracute No. P-4; Barouth No. 3 & No. 4 O.B.I.; Bliss No. 62; Toledo No. 31 & No. 32; Fer. No. EGF 52 Coining; Willard No. 4A o.b.i.; Swaine No. 38 arch; Cons. No. 24 Blanking; Walsh No. 3 O.B.I.

**SAWS (HACK)**—Atkins 8x8"; Racine 6x6"

**SAWS (COLD)**—Cochrane & Bly Nos. 2-B & 4-B; Higley No. 14

**SHAPERS**—S & M, G & E, Ohio, Mt., Q. City, Davis, Ohio & G & E 20"; S & M, Q. City, Rock., Cin. 24"; Ohio 26"; Cin. 24" s. p. qr. box; American 24" heavy, b.g. Amer. 15"; Springf. 15"; S.&M. 26", b.a. G. & E. 24", s.p., gearbox; Amer. 20"; Rockf. 24" gearbox

**SCREW MACHINES**—8 Hand; Gridley 4-sp. ¾"; W. & S. No. 2

**SQUARE SHEAR**—D & K 10' 3/16" cap. Ohl 8' 14-ga.

**SLOTTER**—Barr 12"; Betts 6" stroke; Niles 12"

**TAPPING MACHINES**—(2) Garvin No. 2 & 2X Vertical Automatic & Garvin No. 1.

**TURRET LATHES**—Baush 30" M.D.; Potter & Johnston, 8½x16 No. 10; Libby 24", m.d.; P. & W. 2¼" hole grd. hd.; Greenlee 2¼x26; Brown & Sharpe No.4 W & S No. 4

***Above is only a small part of our large stock on hand***

**McDonald MACHINERY CO.**
1831-35 N. Broadway ST. LOUIS, MO.

# REBUILT MACHINE TOOLS
# AVAILABLE FOR SHIPMENT

**MILLING MACHINES**

No. 10 Pratt & Whitney Hand Mill. Mach.
No. 3 Fox Hand Milling Machine
Steptoe No. 1 plain
Valley No. 2 univ., div. head, p. fds.
Cinc. No. 3, univ., div. head, 3 p. fds.
Brown & Sharpe No. 4, div. head, 3p. fds.
Garvin No. 3, univ., div. head, 3 p. fds.

**LATHES**

14"x6' Monarch, q.c.g.
16x6 Hendey Lathe, geared hd., q.c.g. box
18"x10' Amer. Tool Lathe, qcg., dir. m. dr.
18"x10' Hendey Lathe, q.c.g.
26"x10' Whitcomb Blaisdsell Lathe, q.c.g.
28'x14' Putnam Lathe
48"x20' Fitchburg Lathe

**TURRET LATHES**

No. 2½ Garvin, 1½" cap., p. fd.
No. 5 Acme, 1½ cap., p. fd.
No. 5 Foster, 1⅝" cap., p. fd.
No. 7 Bardons & Oliver, 2" cap., p. fd.
No. 8 Bardons & Oliver, 2¼" cap., 2 p. fds.
Jones & Lamson, 3x36, s. p. drive
Gisholt, 3½" cap., 2 p. fds.

**BORING MILLS**

Binsee Horizontal Boring Mach., spindle 2½", table 48x24
42" Colburn Bor. Mill, 12 spds., 2 gear box
Lucas Horizontal Boring Mill, 2¾"

**SHAPERS & PLANERS**

18" Gould & Eberhard Shaper, Dir. M.D.
24" Gould & Eberhard Shaper, Dir. M.D.
20" Steptoe Shaper, Dir. M.D.
Betts Planer, 36x36x12', 2 swiv. heads
60x60x10 Cincinnati Planer, three heads

**GRINDERS**

12x36" Cinc. Grinder, univ., p. fds. thru gear box
9x30" Brown & Sharpe, cyl., plain
No. 2 Brown & Sharpe Surface Grinder, motor in the base
No. 70 Heald Internal Grinder

**MISCELLANEOUS**

Hilles — Jones, 1" cap., 36" gap, Shear & Punch
Single Frame Hammer, 200 lbs., cap., m-d.
No. 24 Toledo Power Press, geared, 5" str.

**Graham Machine Tool, Inc.** 231 CENTRE STREET, NEW YORK, N. Y.

TEL. WORTH 4-8036

---

No. 2 Warner & Swasey Turret Lathe.
21" Gisholt Turret Lathe.
No. 33 New Britain Chucking Machine.
Model B Becker Vertical Miller.
12" Garvin Cam Cutter.
Model B Briggs Millers, 54" tables.
Garvin Die Slotter.
Diamond Surface Grinder, capacity 12"x36".
Threading Lathe, Reed-Prentice.
21" LeBlond Heavy Duty Lathe.
36" Gould & Eberhardt Gear Cutter.

# DALEY & SIBLEY

**MACHINERY DEALERS INCORPORATED**

**417 Chapel Street, New Haven, Conn.**

# AUTOMATIC SCREW MACHINES

Gridley Sql. Spindle 4¼" Ser. 4000
Gridley 4 Spdl., 1¼" Ser. 4000
Gridley 4 Spdl., ¾" Cap.
Brown & Sharpe Full Auto. No. 19, No. 2, No. 00G
B. & S. Cut Off No. 0, H.S. Oversize
Spdl. Wide Cross Slides, Rebuilt
Cleveland Mod. A, 3¾" Ser. 27000
Cleveland Mod. A, 3½" M.D.
Cleveland Mod. B, 1¼" Ser. 21970
18" Feed
Cleveland Mod. B, ⅞" Ser. 32068

### HAND SCREW MACHINES

No. 4 Bardon & Oliver, Bar, Pwr. to Turret
No. 3 Bardon & Oliver, Bar, Pwr. to Turret
No. 3 Foster. Bar Fd., Pwr. to Turret
No. 2 Woods, Bar Fd., Collets & Tooling
Gisholt 14" Universal

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**1" to 12" Outside**
**2" to 12" Inside**
**1" — 2" — 3" Depth**

**IMMEDIATE DELIVERY**

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**Barnes Camelback, 20" All Grd. Self Oil, Tapper**
Baker 121, No. 4 M.T., All Geared, S.P.D.
Footburt No. 4 M.T., geared
L & G 3 spdl., pwr. feed, No. 2 M.T.

### LATHES

11"x4' South Bend, M.D. Fully Equipped
14"x6' Handey, M.D., Taper Attachment
16"x6' Greaves Klusman, Q.C., Dbl. B.G.
19"x10' Flather, Q.C., 2 Chucks

### SHAPERS

24" Stockbridge, B.G., vise, M.D.
20" Steptoe B.G., Vise, Countershaft
16" Gould & Eberhardt, Vise, Countershaft

### GRINDERS

**Heald—72A-3 Size-matic, 2 motor**
12"x36" Modern, Self Contained
10"x24" No. I Iroquois Universal
6"x12" Greenfield Hydraulic
W. & M. Auto. Surf., 8"x24" Table
Brown & Sharpe No. 2 Surface
Heald No. 65 Cylinder, Internal
Heald Rotary 8" (Bench Type)
Rivett No. 6 Internal

### MILLERS

**No. 3A Brown & Sharpe Univ. All Geared Hd., S.P.D. Div. Hd.**
No. 2 Kempsmith Plain, M.D.
No. 2 Cincinnati Universal, M.D.
No. 1½ Brown & Sharpe Plain, Vert. Att.

### MISCELLANEOUS

Brown & Sharpe 3"x36" Auto. Gear Cutter
Davis Keyseater, No. 2, M.D.
McKenzie Chip Separator, Shaker & Blower
American Oil Extractor, 1 Bu. Cap.
Pratt & Whitney Dble. Table Spline Miller
Bradley Compact Hammer, 125 lb.
Waterbury F. Arch Press, Geared 8" strk.

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**Your Inquiry Will Bring a Complete and Accurate Description of the Machine—All Machines Guaranteed to be Exactly as Represented**

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6' BICKFORD RADIAL DRILL
Motor driven through gear box.

48" GLEASON HEAVY DUTY LATHE
Motor driven; 48" swing; 15' bed.

36" x 12' GOULD & EBERHARDT GEAR CUTTER.

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NATIONAL 12"x12" Hob or Cutter Relief Grinder
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FOSTER No. 1F Fastermatic Turret Lathe
NATCO 13H Hydraulic Multiple Spindle Drill
COLBURN D-2 Mtg. Drill
COLBURN No. 2 four spindle Drill
WESTERN 6' Plain Radial Drill
GLEASON 37" Bevel Gear Planer
GLEASON 6"-11" Bevel Gear Generators
B. & S. No. 13 Spur & Bevel Gear Cutter
G. & E. No. 18H Gear Hobber
LANDIS 3½" Internal Hydraulic Race Grinder
HEALD Nos. 55-60-65 Internal Grinders
BATH No. 2 Universal Grinder
NORTON 6x32 Plain Grinder
INGERSOLL 24"x24"x12' Slab Miller
P & W 8" Auto. Miller
P & W 12"x48" Thread Miller
LEES BRADNER No. 3 Thread Miller
CINCINNATI 18" Auto. Duplex Miller
BLISS No. 73½ Straight Side Press
BLISS No. 160 Single Stroke, Crank Press
CLEVELAND ⅜", ½", ⅝", ⅞" 1¼", 2¼", 2-¾" Model "A" Auto. Screw Machines
WAGNER Hydraulic Cold Saw—Cap. 7"
ESPEN LUCAS No. 138 Cold Saw—Cap. 12" Rd.
NEWTON No. 200 Cold Saw—Cap. 11" rd.
CLEVELAND No. 1 Plate Planer—21' cap.
AMERICAN 36"x36"x20' Planer—4 heads
ACME 1" All Steel Upsetter
AJAX 3" All Steel Upsetter

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410 BROOME STREET, NEW YORK, NEW YORK

# NEED GOOD TOOLS? — SEE US FIRST

**D-31 Fox multiple drill, rectangular head, 16"x31½" spindle centers. No. 2 Morse taper; 10 spindles, hand and power feed to head.**

**AUTOMATICS,** 5½ Model A Cleveland; ⅜-½ & ⅞" Model B

**DIES and MACHINES** for rect. cans, inc. 61 Ams flanger; 72 Ams double seamer; 126CD Adriance double seamer; 281 Adriance gang slitter; No. 114 Adriance Automatic Double Seamer 10" round cans.

**DRILLS,** 36" Cincinnati, back geared sliding head, tapping attachment; No. 4 Quint six spindle turret drill; No. 4 Morse tapers

**DROP HAMMER,** 300 lb. Standard Auto.

**ENGINE LATHES,** 22"x10' Davis dble. back gear quick change; 14" 8' Monarch, plain change; Four 9"x20" Porter Cable Production lathes with back facing attachment.

**MILLING MACHINES,** No. 3½ Pratt & Whitney duplex, 60" table, 27" extreme between spindles; No. 1 Newton slab, 65" table feed.

**TURRET & MONITOR LATHES,** 1 3"x36" Jones & Lamson; No. 1 Am. Tool & Mach., Fox Monitor chasing bar.

**PLANERS,** 24"x6' Pond, one head

**PIPE MACHINES,** 3" Bianall & Keeler; 4" Saunders; both belt drive.

**PRESS,** No. EG 52 Ferracute embossing press

**SAND BLAST,** C-36 New Haven 36"x44" Radial Sand Blast Barrel M.D.

**SEPARATOR,** Large Oil Separator, with hoist; 3 McKenzie chip production

**WIRE STRAIGHTENER,** ¼" Shuster, 10 ft. Cutoff

**Many other tools—exceptional "buys"—write for full details.**

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**Established 1894**

**Air Comp.**, 528 CFM., I-R., ERI, 14x12".

**Air Comp.**, Cent., 15,000 CFM., motor 3/60. (2)

**Air Comp.**, Cent., 10,500 CFM, G.E., motor 3/60/440

**Air Comp.**, Cent., Ing. Rand 10 HP. motor 3/60/220

**Angle Bender**, No. 14 Excelsior, cap. 2x2x¼", B.D.

**Bolt Threader**, 1¼" Landis, Sgl. Hd., lead screw motor 3/60/220V

**Buffers**, 5 HP. B&D., Hvy. Duty, 110 V. DC. 2400 rpm. (2)

**Cold Saw**, No. 7 Espen-Lucas, 24" blades, B.D.

**Die Sinkers**, Keller type E. Automatic, 14"x 22" wide x 10" high

**Drill**, Sensitive 3-spdl. Taylor & Fenn, M.D.

**Drill**, 16" Allen 4-spindle Sensitive

**Drill**, Upright, 20" Champion B.G., power feed, auto. stop, B.D.

**Drill**, Sens. No. ½ Avey, single spindle, ball bearing, on column

**Engine Generator Set**, 22½ KW. Wghse, 125 V. DC., Gas Engine

**Filing Machine**, No. 2 Cochrane-Bly, Belted

**Gas Engine**, Horiz. 35-HP. Bessemer encl. type, 12x16"

**Grinder**, Bench No. 1 B Queen City 1/60/110-220 V. (new)

**Grinder**, Internal No. 23 Baxter, 17" spindle

**Hack Saw**, Peerless 9x9" Gear box, motor 3/60

**Hammer**, Power, 50 lb. Little Giant, cap. 3"

**Hammer**, St. Dr. 1000 lb. Chbg., D. F., cyl. 8" dia. x 42" str.

**Hammers**, SF., Steam or Air, 1100, 1500 & 2000 lbs.

**Lathe**, Coil Winding, 40"x56" motor 3 HP. 3/60

**Lathe**, 18"x8' Superior QCG., 3-step cone, dbl. back geared

**Miller**, Vertical No. 4B Becker, Belt drive

**Planer**, 36"x36"x10' Liberty, 2-hds., PET., M. D.

**Press**, No. ½ Toledo O.B.I. Plain

**Press**, Punch or Horn, No. 116 Niagara, Grd., Str. 1½", M.D.

**Punch**, S.E., No. 7 L.&A., 4" tht., belted md.

**Punches**, gang 36" No. 6 Niag.; 48" Bertsch, M. D.

**Punch & Shear**, S.E. Cleve. G., Pl. jaw, 14" tht., 19" gap. cap. 2x1" for motor drive

**Rod Bench**, 4 spdl. Broden 26" blocks with gear reduction for m.d.

**Sand Blast**, Pangborn AU-3 (near new)

**Shaft Straightening Mach.**, No. 3-A Grier

**Shaper**, horiz. 7" Rhodes, self-contained motor drive, 3/60/220

**Shear**, Angle 6x6x¾" Pels Double for M.D.

**Shear**, Rotary No. 15-A Niagara, with circling attachment

**Shear**, 30" Niagara Power Squaring

**Shear**, Squaring 42"x¼" United 6" gap, not geared, belt drive

**Slotter**, 15" Buckton, 24" Rotary Table, B.D.

**Tapping Machine**, 2" Acme 6-spdl., semi-auto. with motor

**Threading Mach.**, Auto. 2" Rickert-Shafer, boring & Chamfering tools, M.D.

**Turret Lathes**, No. 1 B. & O., Wire Feed, Pl. Head (2)

**Welders**, Butt 200 & 300 KW. Winfield 60 cy., 400 V.

**Welders**, Seam, 125 KVA. Thompson, 60 cy. 220 V.

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No. 2-A W.&S. Univ. Tur. Lathe, M.D.
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No. 24—4-Spdl. New Britain Auto. Chucker
16" Bilgram Bevel Gear Generator
No. 21 Oliver Drill Grinder, motor in base
No. 65 Heald Internal Grinder, arr. M.D.
14"x8' American Tool Room Lathe
20"x12' Hendey Q.C.G. Lathe, taper att., pan bed, M.D.
No. 2 Avey Single Spindle Drill
No. 2 Leland-Gifford Single Spindle Drill
No. 3 4-Spindle Avey Drill
No. 4 Colburn Drill
36"x10' Ingersoll Slab Miller with adj. rail, 3 vertical spindles, single pulley drive

**MOSER MACHINE TOOL SALES — 1608 W. Clybourn St., Milwaukee, Wis.**

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**BORING MILLS**
3" Bar, Floor type-cross tbl.
4" Bar Niles, Knee type
36" Bullard Ra. Prod. Sd. H.
52" Rodgers Vertical 1 head

**DRILLS**
32" Cincinnati Sl. Head. Tap. Att.; 20" to 25" Barnes, B.G. Tap. Att.; 14 sp. Pratt & Whitney Mult.

**HOBBERS & GENER'S.**
5A Lees-Bradner S.P.D.
6" & 11" Gleason bevel gear
26" Rhenania

**LATHES**
3½x60 Fitchb.; Lo-Sw. S.P.D.
9" Sundstrand Prod. S.P.D.
16x8 Lodge & Shipley QCG.
18x8 LeBlond L.C.G.
18x10 South-B, Q.C.G. T.A.
24x8 Sch-Boye, Q.C.G. T.A.
24x12 Sch. Boye Q.C.G. Tap. Att.
27x16' Bridgeford—cone
34x12 Pond L.C.G.

**MILLING MACHINES**
48" Newton Vertical Double Spindle Rotary, M.D.

**PRESSES**
No. 4 Walsh, OBI.
No. 7 R & K Dbl. Crk. 6" St.
Nos. 51 & 52 Ferra. stiles

**MISCELLANEOUS**
Metal Saw: No. 8 Marvel
Broaches: V18 Amer.
1 & 2 Spindle LaPointe
Grinders: 18" to 30" Disc.

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## NEW 3 Phase B. B. Motors ½ to 25 H. P., 5 H. P. $55.75

**DRILLS**
20" Lever, Wheel & Lever and Power Feed.
24" and 28" sliding head, back gear, power feed.
4 spindle Foote-Burt, heavy duty.
32" Hoefer sliding head, new.
17" and 14" Delta, new.
1, 2 and 4 spindle high speed 8" overhang.
5' Bausch Radial Drill.
59 other drills of various sizes and types.

**MISCELLANEOUS**
Brake, Robinson, toggle, 5'.
Grinders, cutter and cylindrical, plain and univ.
Grinders, Bryant deep hole chucking.
Broaching Machines, No. 1 and No. 3 LaPointe.
Keyseater, No. 1 Davis.
Lathe, 24"x16' Greaves & Klusman.
Lathe, 28"x20', 6" Rahn Carpenter, with rais. blocks.
Milling Machine, Briggs Type A.
Milling Machine, Brown & Sharpe No. 12.
Milling Machine, 20"x20"x8' Ingersoll Slab, m. d.
Punch & Shears, several, different sizes.
Shaper, 24" G & E, back geared crank.
Turret Lathe, No. 4 Bardons & Oliver, chuck. equip.
Turret Lathe, 2¼" J. & L. cross slide head.
**MOTORS, REBUILT 3 Phase ½ to 50 HP various speeds.**

***This is only a partial list of our large stock, which is constantly changing. Write for what you need.***

**THE OSBORNE & SEXTON MCHY. CO., Dept. H. COLUMBUS, OHIO**

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No. 452 New Britain 4 sp. Chucker, M.D.
No. 33 New Britain 6 sp. Chuckers, S.P.D. (2)
⅞" Mod. B Cleveland M.D.-G. Head
1½" Mod. B Cleveland, No. 10 B.D.
5A Potter and Johnston, S.P.D.
14"x6' Hendey Lathe, q.c.g., cone drive
12"x4' Hendey Lathe, q.c.g., cone drive

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## AUTOMATICS

No. 33 New Britain Automatic Chucker
No. 56 Acme, motor drive with motor

## DRILLS

Avey sgl. spdl. upright, No. 2 M.T.
No. 315 Baker sgl. spdl.
Leland Gifford 2 Spdl. Hyd. Cycle
Avey 4 Spdl. Sens.
4 Spdl. Allen Ball Bearings (3)
Leland Gifford 6 Spdl. sens.
Davenport Dbl. Opposed Head 5 Spdls. in each head (2)

## GRINDERS

12"x36" P & W Vert. Surface (2)
Modern Self Cont. Cylnd. 8"x30"
48" Diamond Surface (2)
HANCHETT TRAVELING WHEEL TYPE UK CLASS 500

## MISC.

American Hyd. Broach V40
Lipe 2 Spdl. Gear Chamfering Mach.
Oliver No. 36C Wood Saw Cut-Off
Quickwork 36" Sheet Mtl. Bumping Hammer (Dbl.)
Pettingell 36" Bumping Hammer
W. F. Fraser 20' Lapper
No. 1U Bethel Player Lapper 16"
Clevelamd Pointer
No. 13 P & W Sgl. Spdl. Profiler
Dings Magnetic Chip Separator
Webster & Perk 5 Spdl. Tapper
Gaterman 1 Spdl. Tapper
Arc Welder

**IS THIS THE ITEM YOU HAVE BEEN LOOKING FOR?**

**No. 56 Acme Automatic, like new**
**4 Spindle Allen Ball-Bearing Drill Press (3)**
**8"x30" Modern Self-Contained Cylindrical Grinder**
**48" Diamond OS Surface Grinder**
**3¼"x60" Lo-Swing Lathe**
**No. 2 Cincinnati Plain Mill, M.D.**
**American Hyd. Broach**
**24 ASSORTED VERTICAL MILLING HEADS**
**42"x42"x10' Detrick & Harvey Open Side Planer**

¼" Schuster Wire Straighten
Magee Sheet Metal Wiring Edgers
Kent ½" Stud Threader, M.D. & Mtr.

## LATHES

3¼x60" Lo-Swing
9"x20" Porter Cable Hi-spd. Mfg. (4)
14"x6' Reed Prentice, M.D. & Mtr.
14"x8' Seneca Falls, Taper Atchmt. M.D. & Motor
15"x6' Reed Prentice Grd. Hd.
Tpr. At., 4 jaw chuck, face plate etc.
16"x8' Reed Prentice Grd. Hd., All equpt. & Motor
20"x8' American M.D. & Motor
20"x10' Schumacher Boye & Emmes

## MILLS

No. 1 Kempsmith Plain, M.D. & Mtr.
No. 2 Cincinnati Plain, M.D. & Mtr.
No. 8 & No. 50 Bilton Productomatic
No. 15G Bilton Gear Cutters, Auto.

## PLANERS

Lynd Farquhar 26' Comb. OS Crank Planer & Shaper
42"x42"x10' Detrick & Harvey Openside Planer, 2 rail hds. 1 side head

## SHEARS

No. 748 Niagara Power Squaring Mtr. drive & Motor (2)
Oeking Comb. Punch & Shear ⅝" cap.
Ryerson Lennox No. 2 Throatless Bevel, ¾" Plate cap. M.D. & Motor
Buffalo Armor Plate Bar Cutter
No. 14 Pettingell Sht. Mtl. Rotary Mtr. Dr.

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**Turret Lathes:** Libby 18" 3½" hole in spdl.
Warner & Swasey No. 6 Back geared friction head, power feeds, bar work
Gisholt Turret Lathe, 6¼ hole in spindle

**Milling Machines:** Kempsmith No. 1 Univ.
Kent-Owen Semi Automatic

**Lathes:** American 27x16, 8 spindle grd. hd.
Monarch 16x6 Geared Head, M.D.
Lodge & Shipley 14x6 Grd. Head, M.D.
(2) Monarch 12x5 Geared Head, M.D.
American 20x12, 3 step cone, dbl. bk. gr.
Lehman 20x12, 3 step cone, dbl. bk. gr.

**Planers:** Whitcomb 32x36x10 ft., 2 heads
Cincinnati 42x42x12, 3 heads

**Grinders:** Landis 12x36 Plain
Brown & Sharpe No. 14, 7x48 Plain

**Gear Cutters:** G&E-36B for spur & bevel gr.
G&E—12H Gear Hobber
G&E—60" for spur gear

**Iron Workers:** Pels Universal punch 1-1/16 through ⅝, coping and notching attachment, angles 6x6x½
Pels Bar Shear, capacity 3" Rd.
Pels Combination Shear, cap. 4x1-3/16 flats

**ACME EQUIPMENT CO.**
**128 S. Clinton St., :-: Chicago, Ill.**

**Boring Mill, Niles 60" Vert., 2 hds.**
**Boring Mill, Bullard 36" with side hd.**
**Boring Bar, Bement 4" spindle**
**Gear Shaper, Fellows No. 7 High-Speed**
**Gr. Generat., Gleason Spiral Bevel, 4" md.**
**Gear Cutter, Cincinnati No. 3**
**Radial Drill, Western 3' & 5', s.p.d.**
**Radial Drill, Prentice 4' Standard, gr. box, s.p.**
**Miller, Brown & Sharpe No. 3 Univ. compl.**
**Miller, K & T No. 2-B Plain, dbl. overarm**
**Miller, K & T No. 1-A with vert. attach.**
**Miller, Becker Vert., model AB**
**Shaper, Gould & Eberhardt, 24"**
**Shaper, Potter & Johnston, univ. table 24"**
**Lathe, LeBlond 21"x8', Heavy-Duty Qk.Ch.**
**Lathe, American 20"x10', Qk. Ch., gd. hd.**
**Lathe, Hendy 16"x10', taper & relieving attach**
**Grinder, Heim, centerless**
**Grinder, Brown & Sharpe No. 2 Surface**

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Cleveland, Model A, 1¼ & 2"
Gridley, 2¼, 3¼ & 4¼" Single Spdle.
New Britain, No. 22
Automatic Threading Lathes, 13"x6' G.H.

BORING MILLS, 54" Niles, 2 Swivel Heads
42" Bullard, 2 Swivel Heads

DRILLS, Edlund, No. 1A, 4 spdl. P.f. No. 3 M.t. M.D.
Baush & Natco Multiple spindles
Fosdick, 3½' Radial
Henry & Wright, 1 to 8 Spdl., No. 2 mt.

GEAR CUTTERS, Fellows No. 61 Shaper

GEAR HOBBERS, Barber-Colman No. 12

GRINDERS, B. & S. No. 3 Universal
B & S No. 12 & 16 Plain
Heald No. 65 Cylinder
Landis, 16x66" Plain
Norton, 16x36" Crankshaft
Norton, 18"x96" Plain with 30" Gap
Norton, 10x24 & 36" Plain
Cincinnati Face Mill, Excello M.D. spdle.

LAPPERS, No. 15 Norton, M.D.

LATHES, Hendey, 12"x6' 14"x5' & 18x10'
National, 18x8' Cone, Q.C.
Schumacher & Boye, 24"x10' Cone, Q.C.
Acme Turret 3¼x36" M.D.
Jones & Lamson, 3x36" M.D.

MILLS, Becker, Vertical, 30" Rotary Table
Becker Vertical No. 4B
Becker Plain No. 3
Briggs Type A & B Mfg.

PRESSES, No. 94 Bliss, Solid Back
No. 68N Bliss Double Action
No. P 3&4, PG 2&5 Fer., Solid Back
No. 74 & 75 Toledo Open Back

PROFILERS, P. & W. No. 13 Single Spindle

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2 Spdle. Avey H.S. B.B. No. 2 M. T.
1 & 2 Sp. Demco, H.S. B.B.
16" Superior, H.S., B.B.
24" Cinc. Uprt. Pwr. Fd. Back Grd.
21" Excelsior Uprt. Pwr. Fd. Back Grd. New
No. 13 Natco, 16 Spindles
No. 22 Natco Multiple 24 Spdl. Rec. Head, 13½"x31" area
No. 3 Avey, high speed 12" overhang No. 3 M.T.

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14"x10' Hendey Q.C.G., T.A.
16"x8' Greaves Klusman Grd. Hd., Q.C.G.
18"x10' Sidney Q.C.G. Tap. Att.
24"x10' L. & S. Q.C.G., B.G.
24"x12' Schum. Boye q.c.g.
24"x16' So. Bend Std. C. G. Tap. Att.
27"x18' LeBlond Q.C.G., Tap. Att.

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No. 3 Smurr & Kamen Hand
No. 1 Foster Hand
No. 3, 18" Millholland, Air Chuck, Pwr. Fd. Turret Hand Cutoff. M.D.
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No. 2 P & W Hand
No. 6 Whit., Hand, BD&MD.
No. 2 LeBlond Univ. B.G. Cone Hd.
No. 3 Cinc. Plain, M.D.
No. 3A B&S Grd. Hd. Univ. Sgl. Plv. M.D.
No. 3S Cinc. Hi-Pwr. Plain, Sgl. Plv. M.D.
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Gear Cut., No. 3—26"—B&S
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20"x10' Monarch
21"x10' LeBlond

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1—6' Niles Plain Radial Drill

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**Lathe:** 14"x6' Hendey, Q.C., G.H., T.A.
**Lathe:** 16"x10' Whitcomb Blaisdell, Q.C.
**Engine Lathe:** 12'x6' W.C. Young, BG., QC.
**Lathe:** 9"x4' Seneca Falls, B.G., touch
**Lathe:** 15"x6' Greaves Klusman, B.G., Q.C.
**Lathe:** 14"x6' Flather, B.G., Q.C.
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**Press:** Power, Bliss No. 0, stiles, C.B.
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**Several Large Planers**

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36"—60" Harring. Gap; bed cld. 16'; op. 23'
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18"x8' Reed
14"x8' Hendey

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48" Niles-B-P; M.D. 50" rotary table

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PIPE MACHINES, 2" & 6" Jarecki
RIVETER, Hydraulic; 150-ton Chambersburg
PLANER, 18' Hilles & Jones Plate; ¾" cap.
SAW, Hack, 6"x6" Racine; S.P.D.
SAW, Metal Band, No. 8 Marvel; M.D.
SHEAR, Hilles & Jones Throatless Grd. Slitting; 12" blades, ¾" plates, ¼"x4" flats
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14 Ga.x8' Ohl power squaring shear
20" Barnes Self-oiling Drill
No. 12 and No. 13 Natco Drills
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No. 2X Garvin Tapping Machines
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16"x48" Landis Crankshaft grinders
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3 Spindle Kern. B.B., drill with tapping heads
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Lathes 27"x16' Lodge & Shipley M.D.
Lathes 19"x14' Oliver q.c.g.
Lathes 16x8 Bradford Grd. Head M.D. (3)
Lathes 18x8 Whitcomb Blaisdell Geared Hd.
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Millers 2B K & T Plain Motor in Base (3)
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Miller Newton 2 Spindle Rotary Self Oil M.D.
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11" Gleason Generator
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No. 54 Toledo Forge Trimming
No. 12 WaterburyFarrel Forge Trimming
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36"x10' Gray Planer
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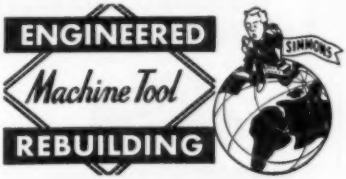


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22" P. & W. Surface

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19/38"x10' LeBlond Gap
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48"x16' Bement Cone

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60" N.B.P. Rotary

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42" Newton 12" cap.
60" Espen-Lucas 20" cap.
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8" Newton Crank
14" Scott, heavy
20" Newton M.D.
30" Baker, Draw Stroke
60" Newton, Portable

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1½"x18" P. & W.
24" American, Fox
1½" Millholland
2¼"x26" Cincinnati Acme
Bardon Oliver 5" hole
Bardon Oliver 7" hole

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Baush 60"—2 Head

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Upright Drills—many makes and sizes

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Disc Grind—All makes & sizes
Nort, 6x32", 10x36", 10x50"
Landis No. 1½ Internal
Landis Nos. 1, 3 & 4 Univ.
Brown & Sharpe No. 14—7"x48"
Landis 12"x96" Plain
Landis 12"x120" Plain
Excello No. 112-A Boring Machine
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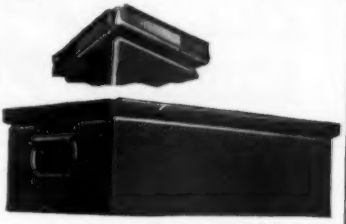

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24"x10' Amer. Grd. Hd.
24"x12' Putnam Grd. Hd., M.D.
24"x12' Reed Prentice Grd. Hd., T.A., Q.C.G.
24"x18' N.B.P. Q.C.G., T.A.

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28"x12' Lodge & Shipley, M.D.
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30"x16' N.B.P. Axel & Journal, Center Drive, M.D.
32"x18' Fifield, triple grd.
33"/47"x16' Putnam, Cone
36"x14' Rahn Larmon, Q.C.G., Cone
36"x25' Pond, 2 carr., Tri. Grd.
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42" N.B.P. Center Dr. Whl.
48"/60"x14' Putnam, Heavy
48"x16' Fifield Cone
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Slotter, 15" Putn., D.C., M.D.
Slotter, 18" Newton, Hyy. D.
Slotter, 24" Dill A.C., M.D.
Swager, No. 6 Langelier, M.D.


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